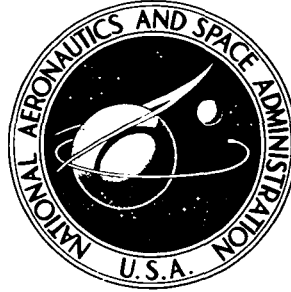


**NASA TECHNICAL
MEMORANDUM**



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**NOISE GENERATED BY
QUIET ENGINE FANS
III - Fan C**

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and Ralph F. Schmiedlin*

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III - FAN C

by Francis J. Montegani, John W. Schaefer, and Ralph F. Schmiedlin

Lewis Research Center

SUMMARY

A significant effort within the NASA Quiet Engine Program was devoted to acoustical evaluation at the Lewis Research Center full-scale-fan noise test facility of a family of fans designed with low-noise features and built by the General Electric Company. This report, the last of a three-part series covering the three fans tested, documents the noise results obtained with fan C - a 1.6-pressure-ratio, 472-m/sec (1550-ft/sec) tip speed fan. The fan is described and some aerodynamic operating data are given. Far-field noise around the fan was measured over a range of operating conditions for a variety of configurations having different arrangements of sound-absorbing material in the flow ducts. Complete results of 1/3-octave band analysis of the data are presented in tabular form. Included also are acoustic power spectra and sideline perceived noise levels. Representative 1/3-octave band data are presented graphically, and sample graphs of continuous narrow-band spectra are also provided.

INTRODUCTION

The NASA Quiet Engine Program was directed toward developing technology having direct application in the alleviation of noise from subsonic commercial aircraft. The most tangible results of the program were demonstrator high-bypass-ratio turbofan engines which, by the incorporation of such technology, were markedly quieter than then-available engines (ref. 1).

A significant effort within the Quiet Engine Program was devoted to acoustical and aerodynamic evaluation of a family of full-scale component fans. The designs of these fans were varied to develop a better understanding of the mechanisms of fan noise generation and to permit the selection ultimately of a minimum-noise design for incorporation in the Quiet Engine. Three such fans were built, each designed to meet propulsion

system requirements but varying significantly in aerodynamic design parameters which were considered to be noise related. In addition, all fans possessed the accepted low-noise features of being single stage, having no inlet guide vanes, having extended rotor-stator spacing, and having an appropriate vane/blade ratio.

The three fans were letter designated as A, B, and C. All were designed and built by the General Electric Company. A comparative summary of their more pertinent design characteristics is given in table I. Of the three fans, fan C was the last to undergo an extensive acoustical test program at the Lewis Research Center. This report documents the more significant noise data obtained in that program. Results obtained with fans A and B are given in references 2 and 3.

Interpretation of the data is subject to the ultimate interests of the user. Further, it is facilitated by a comparison of data from all fans tested, only one of which is being reported herein. For these reasons no attempt is made at interpretation from any point of view. Rather, emphasis is placed on completeness and convenience of format for all potential users.

FAN DESIGN CHARACTERISTICS

A complete discussion of the aerodynamic and mechanical design details of fan C is given in reference 4. Only a brief qualitative description is given here. Fan C, relative to the other fans in the program, was characterized generally as being a high-tip-speed, moderate-aspect-ratio fan with a low number of blades. The fan is illustrated in the cut-away view of the test assembly shown in figure 1. For testing purposes the fan was shaft-driven from the front as illustrated. All the fans were designed with sound-absorbing liners in the fan frame. Further discussion of the fan frame is given in the section TEST HARDWARE.

FAN PERFORMANCE

Extensive aerodynamic testing of the fan was conducted at the General Electric facilities in Lynn, Massachusetts; the detailed results are given in reference 5. A performance map based on fan bypass flow is given in figure 2. The constant-speed lines shown dashed are from the aerodynamic tests described in reference 5. For the tests at the noise facility, a minimal amount of aerodynamic instrumentation was used, from which the fan operating lines, shown in figure 2, were derived for the various nozzle areas employed as reported herein.

TEST HARDWARE

Cross sections of the hardware used for acoustical testing are shown in figure 3. The fan was run in a variety of configurations by using various combinations of the elements shown. Each configuration differed with regard (1) to the amount of acoustical treatment in the inlet, (2) the extent of active fan-frame treatment, (3) the amount of acoustical treatment in the bypass exhaust duct, and (4) the size of the bypass nozzle. The variations employed in each of these areas and the terminology used are explained in the next section.

Hardware Variables

Inlet. - The fan was run with three inlet conditions - "hard," "suppressed," and "treated wall." The hard inlet comprised a bellmouth and a 101.6-centimeter (40-in.) long cylindrical section mated to the fan frame. This is illustrated at the top in figure 3.

The suppressed inlet consisted of an acoustically treated cylindrical outer section and three treated straight cylindrical splitters which collectively constituted a bolt-on inlet suppressor. This is shown as the alternative inlet in figure 3. The details of this suppressor design have been reported in reference 6, which includes also a discussion of its use with another fan. Because of the difference in diameter between the fan C frame and the inlet suppressor, a short converging adapter was used to mate the two as illustrated in figure 3.

The treated-wall inlet consisted of the outer cylindrical portion only of the inlet suppressor, that is, the suppressor without the splitter rings.

Fan frame. - The fan was designed, as were all fans in the Quiet Engine Program, with sound-absorbing liners in the fan frame. The fan frame extended from a plane approximately 41 centimeters (16 in.) upstream of the fan rotor face to a plane approximately 61 centimeters (24 in.) downstream of the stator. The extent of the fan frame is noted in figure 3. Details of the fan-frame treatment, which was a multiple-degree-of-freedom resonator type, are given in reference 4. Fan-frame treatment existed also in the core passage walls near the stator. The fan was run with all fan-frame treatment functional, denoted as "fully treated," and with various sections of it deactivated by the use of adhesive aluminum tape. This was accomplished by first taping over all the fan-frame treatment, a configuration denoted as "fully taped," and by next removing the tape upstream of the rotor, then between the rotor and stator, and lastly, downstream of the stator. This resulted in two partially treated fan-frame configurations. The one with functional treatment upstream of the rotor only is denoted as "fore-rotor treated." The other, which had, in addition, functional treatment between the rotor and stator,

is denoted as "fore-stator treated." For all configurations, the fan-frame treatment in the core duct remained functional.

Bypass exhaust duct. - The fan was run with both "hard" and "suppressed" exhaust duct conditions. The "hard" exhaust condition refers to the bypass duct with no sound-absorbing treatment. Alternately, the suppressed condition employed treatment in the duct walls and a treated splitter. The arrangement and dimensions of the suppressor are given in figure 3.

Nozzles. - Three separate bypass exhaust duct nozzles were used. These are referred to as nominal, large, and small - corresponding to the three operating lines shown in figure 2. The nominal nozzle had an exit area of 0.995 square meter (1543 sq in.). The small and large nozzle areas deviated approximately 7 percent and 11 percent, respectively, from nominal. The core nozzle area was increased during the course of the test program to better simulate operation of the hub of the fan under engine conditions. But the change was insufficient to influence the aerodynamic data presented in figure 2.

The geometric variables of the nozzles which may relate to jet noise generation are given in table II. The bypass nozzle exit plane was upstream from that of the core. The axial distances between the bypass and core nozzle exit planes are also given in table II.

Core Duct

For all tests, the core flow was simply ducted aft through a nozzle of a size to cause the hub portion of the fan to operate as closely to engine conditions as possible. To reduce emission of internal noise from the core duct, a core suppressor was installed as illustrated in figure 3. The suppressor consisted of polyurethane foam held in place in the core duct outer wall by a perforated metal facing sheet and had an active area of 1.626 square meters (17.5 sq ft).

DATA ACQUIRED

The configurations for which acoustical data are being reported herein are described in table III. Each configuration was run at various speeds. For every test, far-field noise was measured and the results of these measurements constitute the substance of this report.

One of the tests involved wrapping the entire fan outer casing with acoustical damping material in order to modify the casing emission characteristics and thus gain some qualitative assessment of noise from that source. This is designated as the muffled casing

(see footnote c, table III). It was made by wrapping the fully suppressed configuration with 15.2 centimeters (6 in.) of open-cell polyurethane ether foam.

In some instances, in order to avoid the risk of incurring program delays because of impending inclement weather, aerodynamic and acoustical data were obtained simultaneously. This meant obtaining acoustical data while instrumentation rakes were protruding into the bypass jet stream at the nozzle exit. Such tests are so denoted by footnote a in table III. Results from previous tests with the other two fans in the program showed that such instrumentation had little or no effect on the data, and the compromise was well worth the potential delays avoided.

DATA ACQUISITION AND ANALYSIS

Test Site

The acoustical tests were conducted at the outdoor full-scale-fan noise test facility at the Lewis Research Center (fig. 4). A plan view of the area is given in figure 5. The facility abuts the 10- by 10-Foot Supersonic Wind Tunnel drive motor building and utilizes the wind tunnel drive motors as the fan prime mover through a speed-increasing gearbox. The fan pedestal was located sufficiently far from the building to permit placement of far-field microphones on a 30.5-meter- (100-ft-) radius arc every 10° , from 10° to 160° , with respect to the fan inlet axis. The 120° and 160° microphone distances were actually greater than 30.5 meters (100 ft) by 0.9 and 1.4 meters (3 and 4.5 ft), respectively, because of the presence of a sidewalk in the microphone field. The fan axis was 5.8 meters (19 ft) from the ground, and the microphones were all in the same horizontal plane. The ground plane was asphalt pavement. The exterior wall of the drive building was treated with sound-absorbing material to minimize reflections to the microphone array. There were no other major reflecting surfaces in the near vicinity of the site.

It should be noted, for the data reported herein, that the center of the microphone arc intersected the fan assembly axis near the nozzle exit plane. The actual distance of the center of the arc from the fan component, which is the more customary arc center, was 3.5 meters (11.7 ft) (fig. 5). This situation resulted from the evolutionary process of developing the test facility and is not significant in itself. Care, however, should be exercised in making detailed comparisons of the data, particularly one-to-one angular comparisons, with data obtained from assemblies whose center of the arc lies elsewhere.

Test Procedure

The instrumentation and data recording system had a flat response over the frequency range of interest (50 to 20 000 Hz). Prior to the set of tests for each configuration, a pistonphone signal was impressed on each far-field microphone for absolute calibration of each channel. Data signals were FM recorded from all channels simultaneously on magnetic tape. Air temperature, pressure, and relative humidity were logged before and after testing; and wind velocity and direction were logged at each data point. To minimize problems with ambient noise and unfavorable wind conditions, tests were usually conducted in the early morning hours prior to sunrise, when weather conditions were calm and stable. No acoustical data were taken under conditions of fog or precipitation or with wind or gusts in excess of 5.1 meters per second (10 knots).

Corrected fan speeds were used which corresponded to 60, 70, 80, and 90 percent of standard-day cruise design speed. For this reason, the fan physical speeds employed varied from day to day with ambient temperature variations. The 60- and 90-percent speed points approximately represent fan operation for a four-engine aircraft at approach and takeoff conditions, respectively. Generally, the fan was run over the speed range three times, and three nonconsecutive 100-second noise samples for each speed were recorded.

One-Third-Octave Band Analysis

Data reduction system. - Each of the three samples for a given speed was reduced separately by using a 1/3-octave band analyzer. The resulting sound pressure levels were arithmetically averaged. The analysis system employed a 4-second averaging time and stepped sequentially through the angles from 10° to 160° . The 4-second averaging time was a compromise to accommodate all angles within a 100-second sample while preserving analyzer repeatability. All three-sample averages for each frequency and angle were examined statistically. The standard deviations of the great bulk of the data were less than 1 decibel.

Adjustments to measured data. - Results of 1/3-octave band analysis yielded data taken under ambient conditions of the test day at the microphone locations. The data were rendered lossless (i.e., the effect of atmospheric absorption was removed) by computing atmospheric absorption for the test conditions over the propagation path and adding it to the data.

Atmospheric absorption was computed by using continuous functions of frequency deduced from reference 7. The application procedures set forth in reference 7 were not used, as they presuppose a spectrum typical of engine jet noise. In the present case,

the general shape of the measured spectrum was used to obtain an integrated value of absorption for each 1/3-octave band.

For reference purposes and to permit extrapolation of data provided herein to other distances, standard-day atmospheric absorption values are given in table IV. These values are based on the assumption of a flat 1/3-octave band spectrum and therefore are not precisely those computed for any real spectrum. However, the values are nominally those employed in the data adjustments and are sufficiently accurate for estimating noise projections to other distances.

The lossless data were adjusted to constant radius and acoustic power and directivity index calculations were made. No lossless directivity index data are presented herein, but they may be readily derived from the data (see the section DATA PRESENTATION). For acoustic power calculations, the sound pressure levels were presumed to be axisymmetric and were integrated over an enclosing hemisphere. Implicit in this procedure was that the ground plane was perfectly reflective in the sense that acoustic intensity was doubled in the far field. No account was made of signal interference effects at the microphones due to ground reflections.

Using lossless data, calculations of atmospheric absorption for a standard day of 15° C (59° F) and 70-percent relative humidity were made and the data so adjusted to standard-day conditions. All tabulated sound-pressure-level data reported herein are adjusted to standard-day conditions.

A more thorough discussion of the material presented in this section and the computer programs employed are given in reference 8.

Narrow-Band Analysis

Continuous narrow-band spectral analyses of the noise signals were also performed. The analysis system employed a 20-hertz constant-bandwidth filter over the frequency range 0 to 10 000 hertz. The narrow-band spectra were not adjusted in any way and represent the signals at the microphones under test-day conditions.

Narrow-band spectra constitute a highly detailed examination of the data and may reveal features which are otherwise not evident but which aid in understanding the noise-generating mechanisms. In this sense, they reflect a specialized interest in the data and do not share in the wide practical utility of 1/3-octave band data. For this reason, and considering the simple nature of the source, only a limited number of narrow-band spectra are presented herein as general information.

DATA PRESENTATION

Tabulations

All standard-day 1/3-octave band data on a 30.5-meter (100-ft) arc which were obtained from the acoustical test program are presented in tabular form. Table III lists the fan configurations for which data are presented. The actual noise data appear in tables V to XV inclusive, in increasing order of configuration number. Each table is identified by configuration number and speed and contains descriptive information about the configuration.

The noise data table entries are standard-day sound pressure levels (SPL referred to 0.00002 N/sq m) in each 1/3-octave band for each angle on a 30.5-meter (100-ft) radius. Overall sound pressure levels which were computed from the 1/3-octave band data are also given.

Using lossless data, calculations of acoustic power level (PWL) were made by multiplying the sound intensity at each angle by its respective incremental area on the surface of a hemisphere and summing the increments of power so obtained (ref. 8). Radiation through polar areas for which no data were obtained was neglected. Acoustic power levels are presented in the tables referred to 10^{-13} watts (0.1 pW).

Each acoustic power level has associated with it an average sound pressure level, which is the sound pressure level produced by a source emitting the same acoustic power but radiating uniformly in all directions. For the individual frequency bands, average sound pressure level may be used to quickly compute directivity index. Since average sound pressure level is for lossless data and the table entries include standard-day atmospheric absorption, directivity index can be obtained by subtracting atmospheric absorption for 30.5 meters (100 ft) (table IV) from the average sound pressure level and subtracting the result from the table entries at all angles. Unfortunately, there is no direct way to compute the directivity index for the overall sound pressure levels by using the data provided.

For all cases, projections were made to a sideline 61 meters (200 ft) from and parallel to the fan axis, and perceived noise levels in PNdB were computed in accordance with reference 9. These perceived noise levels are provided in the tables and permit a quick and practical comparison, among all the data, of the relative noise generated. In addition, sideline perceived noise levels are provided at 113 meters (370 ft) for the approach-speed case (60 percent of design speed) and at 305 meters (1000 ft) for the takeoff-speed case (90 percent of design speed). These distances typify aircraft altitudes at FAA-regulated noise certification locations (ref. 9), and the data indicate generally the community noise levels to be expected from the fan compared with FAA regulations. The data provided are for a single fan; the perceived noise levels for n fans may be approximated very closely by adding $10 \log n$ to the single-fan values.

Graphical Data

One-third-octave band data. - For many configurations, the 1/3-octave band data are qualitatively similar. For this reason, data from only selected configurations, unsuppressed and fully suppressed, are presented graphically to illustrate general features. These are configurations 305 and 309, for which data are presented in figures 6 and 7, respectively. Detailed comparisons of different configurations should be made by using the tabulated data. Graphical data presentations consist of standard-day 1/3-octave band sound pressure levels at a 30.5-meter (100-ft) radius for all angles and speeds.

Narrow-band data. - Because of their special nature, only representative samples of narrow-band spectra are presented to illustrate their general character. Spectra at or near the peak noise angles, front and rear, at 60- and 90-percent speeds have been selected. These are presented for configurations 305 and 309 in figures 8 and 9, respectively.

CONCLUDING REMARKS

A program of noise tests with fan C was conducted at the Lewis Research Center. Fan C is characterized generally as having a high tip speed and 26 moderate-aspect-ratio blades. It is one of three full-scale fans built under the NASA Quiet Engine Program, each of which varies significantly in design characteristics which may be noise related.

Acoustical tests were conducted over a range of aerodynamic operating conditions and with various arrangements of sound-absorbing material. Complete far-field noise results obtained in the tests are presented without interpretation. The data are presented in tabular form in a format intended to be useful to the majority of interested users. The presentation of these results is part of a continuing program directed toward a better understanding of the mechanisms of fan noise generation and the alleviation of noise from turbofan propulsion systems.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, November 11, 1975,
505-03.

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TABLE I. - DESIGN CHARACTERISTICS OF FANS A, B, AND C

| Characteristic | Fan A | Fan B | Fan C |
|--|---------------|---------------|---------------|
| Corrected rotor tip speed, m/sec (ft/sec) | 354 (1160) | 354 (1160) | 472 (1550) |
| Inlet hub/tip radius ratio | 0.465 | 0.465 | 0.360 |
| Rotor inlet tip diameter, m (in.) | 1.86 (73.354) | 1.86 (73.354) | 1.73 (68.300) |
| Corrected airflow, kg/sec (lb/sec) | 431 (950) | 431 (950) | 415 (915) |
| Inlet corrected specific flow, kg/sec/sq m (lb/sec/sq ft) | 202 (41.3) | 202 (41.3) | 202 (41.3) |
| Number of rotor chords axially separating rotor and outer outlet guide vanes | 2.0 | 2.0 | 2.0 |
| Number of rotor chords axially separating rotor and inner outlet guide vanes | 1.25 | 1.25 | 1.25 |
| Bypass-portion total pressure ratio | 1.50 | 1.50 | 1.60 |
| Hub-portion total pressure ratio | 1.32 | 1.43 | 1.49 |
| Bypass ratio | 5.6 | 5.4 | 5.0 |
| Rotor aspect ratio | 2.32 | 1.71 | 2.09 |
| Rotor solidity: | | | |
| Outside diameter | 1.45 | 1.30 | 1.40 |
| Inside diameter | 2.50 | 2.16 | 2.45 |
| Number of rotor blades | 40 | 26 | 26 |
| Number of outer outlet guide vanes | 90 | 60 | 60 |
| Number of inner outlet guide vanes | 90 | 60 | 60 |

TABLE II. - NOZZLE GEOMETRY

[Stator annulus exit area, 1.274 sq m (1974 sq in.).]

| Dimension | Bypass nozzle | | | Core nozzle | |
|---|---------------|--------------|--------------|------------------------|-----------------------|
| | Nominal | Large | Small | Before area adjustment | After area adjustment |
| Area, sq m (sq in.) | 0.995(1543) | 1.102(1708) | 0.923(1430) | 0.225(349) | 0.250(387) |
| Outside diameter, m (in.) | 1.594(62.77) | 1.629(64.14) | 1.562(61.51) | 0.766(30.15) | 0.787(31.00) |
| Annulus height, m (in.) | 0.235(9.27) | 0.258(10.15) | 0.220(8.68) | 0.109(4.30) | 0.119(4.68) |
| Axial distance (bypass exit plane to core exit plane), m (in.): | | | | | |
| 0.225-sq m (349-sq in.) core nozzle | 0.574(22.6) | 0.561(22.1) | 0.569(22.4) | ----- | ----- |
| 0.250-sq m (387-sq in.) core nozzle | 0.493(19.4) | 0.480(18.9) | 0.488(19.2) | ----- | ----- |

TABLE III. - ONE-THIRD-OCTAVE BAND FAR-FIELD NOISE DATA PRESENTED

| Configuration | Configuration description | | | | | | | | Table |
|---------------------|---------------------------|---------------------|------------|---------------|-------------|--------|-----------|--------|-------|
| | Inlet | Fan frame | Exhaust | Bypass nozzle | Bypass area | | Core area | | |
| | | | | | sq m | sq in. | sq m | sq in. | |
| a ₃₀₂ | Hard | Fully taped | Hard | Nominal | 0.995 | 1543 | 0.225 | 349 | V |
| 303 | ↓ | Fore-rotor treated | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | VI |
| 304 | ↓ | Fore-stator treated | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | VII |
| b ₃₀₅ | ↓ | Fully treated | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | VIII |
| a ₃₀₆ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | .250 | 387 | IX |
| a, c ₃₀₈ | Suppressed | ↓ | Suppressed | ↓ | ↓ | ↓ | ↓ | ↓ | X |
| a, b ₃₀₉ | Suppressed | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | XI |
| 310 | Treated wall | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | XII |
| 311 | Hard | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | XIII |
| 312 | ↓ | ↓ | ↓ | Large | 1.102 | 1708 | ↓ | ↓ | XIV |
| 313 | ↓ | ↓ | ↓ | Small | .923 | 1430 | ↓ | ↓ | XV |

^aAerodynamic measurement rakes in bypass jet flow.^b1/3-Octave band and narrow-band data presented graphically (figs. 6 to 9).^cMuffled casing.

TABLE IV. - STANDARD-DAY ATMOSPHERIC ABSORPTION

[Computed for a flat 1/3-octave band spectrum; temperature, 15° C (59° F); relative humidity, 70 percent.]

| Band center frequency, Hz | Per 100 meters (300 ft) | Per 305 meters (1000 ft) | At 30.5 meters (100 ft) |
|---------------------------|-------------------------|--------------------------|-------------------------|
| | Attenuation, dB | | |
| 50 | 0.0 | 0.1 | 0.0 |
| 63 | ↓ | ↓ | ↓ |
| 80 | ↓ | ↓ | ↓ |
| 100 | ↓ | ↓ | ↓ |
| 125 | .1 | .2 | ↓ |
| 160 | ↓ | .2 | ↓ |
| 200 | ↓ | .3 | ↓ |
| 250 | ↓ | .4 | ↓ |
| 315 | .2 | .5 | ↓ |
| 400 | .2 | .6 | .1 |
| 500 | .2 | .7 | ↓ |
| 630 | .3 | .9 | ↓ |
| 800 | .4 | 1.2 | ↓ |
| 1 000 | .5 | 1.5 | ↓ |
| 1 250 | .6 | 1.9 | .2 |
| 1 600 | .8 | 2.4 | .2 |
| 2 000 | 1.0 | 3.1 | .3 |
| 2 500 | 1.4 | 4.2 | .4 |
| 3 150 | 1.8 | 5.6 | .6 |
| 4 000 | 2.5 | 7.7 | .8 |
| 5 000 | 3.6 | 11.0 | 1.1 |
| 6 300 | 5.1 | 15.6 | 1.6 |
| 8 000 | 7.4 | 22.5 | 2.2 |
| 10 000 | 10.6 | 32.2 | 3.2 |
| 12 500 | 15.1 | 46.0 | 4.6 |
| 16 000 | 21.4 | 65.2 | 6.5 |
| 20 000 | 30.3 | 92.4 | 9.2 |

TABLE V. - NOISE OF FAN C CONFIGURATION 302 (HARD INLET, FULLY TAPED FAN FRAME, HARD EXHAUST, NOMINAL NOZZLE,

RAKES) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3168 rpm; fundamental blade passage frequency, 1372 hertz.

| FREQUENCY | ANGLE, °DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|------|-------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 | 160 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 77.9 | 79.9 | 81.9 | 79.7 | 82.2 | 80.2 | 83.5 | 75.7 | 77.4 | 75.9 | 76.4 | 76.3 | 77.4 | 78.9 | 80.9 | 82.4 | 79.6 | 127.0 |
| 63 | 74.2 | 73.7 | 74.2 | 72.5 | 73.7 | 72.5 | 73.5 | 71.5 | 72.4 | 73.0 | 74.7 | 75.8 | 77.2 | 78.9 | 80.9 | 82.7 | 75.7 | 123.1 |
| 80 | 77.4 | 73.9 | 73.4 | 71.0 | 72.4 | 71.2 | 71.5 | 71.2 | 72.4 | 74.4 | 76.2 | 78.0 | 80.0 | 82.0 | 83.4 | 85.4 | 77.5 | 124.9 |
| 100 | 78.9 | 75.5 | 78.0 | 77.2 | 78.4 | 74.0 | 74.4 | 75.2 | 76.9 | 77.9 | 81.0 | 81.0 | 82.7 | 84.2 | 84.9 | 85.6 | 80.1 | 127.5 |
| 125 | 80.9 | 80.1 | 80.4 | 78.9 | 78.7 | 79.2 | 77.6 | 77.7 | 79.7 | 80.2 | 82.1 | 83.2 | 84.1 | 84.4 | 85.4 | 85.1 | 81.5 | 128.9 |
| 160 | 82.0 | 81.2 | 82.3 | 79.5 | 80.7 | 79.8 | 79.0 | 80.5 | 80.5 | 80.7 | 81.7 | 82.4 | 81.5 | 82.3 | 83.3 | 82.7 | 81.1 | 128.5 |
| 200 | 84.7 | 85.2 | 86.6 | 80.1 | 84.2 | 80.6 | 76.9 | 77.6 | 76.6 | 77.7 | 78.6 | 79.3 | 81.1 | 82.7 | 82.2 | 81.3 | 81.1 | 128.5 |
| 250 | 83.6 | 83.9 | 83.6 | 82.4 | 83.1 | 81.3 | 80.4 | 78.6 | 79.9 | 81.4 | 82.1 | 82.9 | 84.1 | 84.1 | 83.3 | 81.5 | 82.2 | 129.6 |
| 315 | 83.4 | 83.2 | 84.2 | 82.6 | 84.6 | 81.2 | 80.1 | 79.2 | 79.9 | 80.7 | 81.1 | 82.0 | 82.6 | 82.7 | 81.9 | 79.6 | 81.8 | 129.2 |
| 400 | 86.7 | 86.0 | 86.3 | 84.3 | 84.7 | 81.3 | 81.2 | 80.3 | 81.2 | 82.2 | 82.7 | 83.6 | 84.8 | 84.7 | 82.7 | 81.1 | 83.4 | 130.8 |
| 500 | 87.0 | 86.3 | 86.3 | 86.3 | 86.7 | 83.2 | 82.3 | 81.8 | 82.2 | 83.2 | 83.8 | 84.4 | 85.0 | 84.2 | 83.0 | 81.2 | 84.3 | 131.7 |
| 630 | 88.2 | 88.0 | 87.7 | 87.4 | 85.9 | 83.5 | 83.2 | 82.9 | 83.7 | 84.5 | 85.2 | 85.8 | 87.4 | 86.5 | 83.7 | 82.1 | 85.5 | 132.9 |
| 800 | 90.1 | 90.3 | 89.1 | 88.4 | 88.1 | 86.3 | 85.4 | 84.8 | 85.6 | 86.3 | 86.8 | 87.9 | 89.3 | 88.3 | 84.6 | 82.6 | 87.3 | 134.7 |
| 1000 | 93.3 | 91.8 | 91.6 | 91.1 | 90.5 | 88.1 | 87.3 | 85.8 | 86.8 | 87.4 | 88.3 | 89.7 | 91.3 | 89.9 | 86.1 | 84.0 | 89.3 | 136.7 |
| 1250 | 100.5 | 101.9 | 102.7 | 104.5 | 105.4 | 104.5 | 103.0 | 97.5 | 93.5 | 94.2 | 96.4 | 97.8 | 98.5 | 97.4 | 94.2 | 92.1 | 101.0 | 148.4 |
| 1600 | 97.3 | 98.1 | 99.3 | 100.1 | 101.0 | 99.6 | 97.8 | 93.5 | 90.6 | 91.3 | 93.5 | 94.6 | 96.8 | 94.0 | 91.1 | 89.4 | 96.9 | 144.3 |
| 2000 | 93.1 | 93.6 | 94.1 | 93.9 | 93.6 | 91.2 | 89.4 | 88.2 | 89.1 | 89.6 | 91.4 | 92.0 | 94.9 | 91.8 | 89.3 | 85.5 | 92.0 | 139.4 |
| 2500 | 96.7 | 96.9 | 98.7 | 99.9 | 99.7 | 97.7 | 95.0 | 91.4 | 91.2 | 91.7 | 92.4 | 93.3 | 95.4 | 94.9 | 91.5 | 87.9 | 96.0 | 143.4 |
| 3150 | 94.0 | 95.0 | 96.0 | 96.7 | 96.7 | 94.5 | 91.5 | 89.2 | 89.2 | 90.2 | 91.8 | 92.9 | 95.0 | 93.5 | 90.0 | 86.4 | 93.9 | 141.3 |
| 4000 | 94.5 | 96.0 | 97.8 | 99.6 | 99.5 | 96.8 | 93.5 | 90.6 | 90.1 | 91.3 | 93.1 | 93.8 | 95.6 | 93.6 | 91.1 | 87.7 | 95.9 | 143.3 |
| 5000 | 93.3 | 95.0 | 94.2 | 96.0 | 95.0 | 93.3 | 89.5 | 87.2 | 88.8 | 89.3 | 91.3 | 92.1 | 94.0 | 92.8 | 90.2 | 86.6 | 93.4 | 140.8 |
| 6300 | 92.2 | 93.0 | 93.5 | 94.2 | 93.5 | 91.5 | 86.8 | 84.1 | 86.1 | 86.3 | 88.9 | 89.2 | 90.9 | 89.6 | 87.6 | 83.2 | 91.7 | 139.1 |
| 8000 | 90.9 | 92.6 | 93.7 | 93.6 | 93.4 | 91.1 | 85.9 | 82.6 | 84.6 | 85.9 | 88.1 | 88.0 | 89.7 | 87.7 | 86.2 | 81.7 | 91.7 | 139.1 |
| 10000 | 89.8 | 91.5 | 91.8 | 92.0 | 91.6 | 90.5 | 84.1 | 79.8 | 81.9 | 82.6 | 85.6 | 85.8 | 87.5 | 85.3 | 83.6 | 78.6 | 90.9 | 138.3 |
| 12500 | 88.6 | 89.8 | 89.6 | 89.6 | 89.4 | 87.5 | 82.0 | 77.0 | 78.2 | 79.8 | 82.2 | 82.2 | 84.2 | 81.7 | 80.2 | 74.5 | 89.7 | 137.1 |
| 16000 | 87.4 | 86.7 | 88.5 | 88.7 | 87.4 | 83.7 | 80.5 | 72.6 | 74.7 | 74.9 | 77.3 | 77.5 | 79.3 | 77.4 | 77.0 | 71.1 | 88.9 | 136.3 |
| 20000 | 84.6 | 82.3 | 87.0 | 83.9 | 85.5 | 79.2 | 81.7 | 66.6 | 69.8 | 70.7 | 72.8 | 73.7 | 75.0 | 72.1 | 72.1 | 66.4 | 89.2 | 136.6 |
| OVERALL | 106.3 | 107.1 | 108.0 | 109.1 | 109.4 | 107.9 | 105.8 | 101.7 | 100.4 | 101.2 | 102.9 | 103.8 | 105.5 | 104.1 | 101.5 | 99.1 | 106.2 | 153.6 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 92.3 | 101.2 | 106.5 | 110.0 | 111.9 | 111.0 | 109.4 | 106.7 | 106.8 | 107.4 | 108.6 | 108.5 | 109.0 | 106.0 | 100.6 | 93.5 | | |
| 113 METERS | 83.5 | 93.5 | 99.5 | 103.2 | 105.2 | 104.6 | 103.3 | 100.4 | 100.5 | 101.0 | 102.0 | 101.9 | 102.3 | 99.3 | 93.6 | 86.0 | | |

(b) Percent of design speed, 70; fan physical speed, 3696 rpm; fundamental blade passage frequency, 1601 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 80.5 | 76.0 | 79.3 | 77.2 | 80.5 | 77.3 | 78.0 | 77.7 | 79.0 | 79.5 | 80.2 | 81.6 | 82.2 | 84.0 | 86.7 | 88.0 | 81.2 | 128.6 |
| 63 | 86.3 | 82.1 | 80.3 | 87.1 | 84.1 | 80.8 | 78.8 | 78.6 | 77.1 | 78.3 | 82.1 | 82.2 | 84.0 | 85.1 | 87.8 | 89.0 | 83.2 | 130.6 |
| 80 | 76.8 | 76.0 | 78.1 | 74.5 | 79.1 | 76.0 | 75.3 | 75.8 | 78.0 | 79.6 | 81.8 | 83.4 | 86.3 | 88.1 | 90.8 | 92.2 | 83.7 | 131.1 |
| 100 | 78.6 | 76.8 | 79.8 | 76.6 | 80.1 | 77.8 | 78.4 | 79.3 | 81.6 | 83.1 | 85.1 | 86.4 | 88.4 | 89.9 | 91.9 | 92.7 | 85.5 | 132.9 |
| 125 | 85.5 | 85.1 | 89.3 | 82.8 | 84.6 | 85.0 | 84.5 | 84.3 | 85.5 | 86.5 | 87.0 | 88.9 | 89.8 | 91.5 | 93.0 | 91.4 | 87.8 | 135.2 |
| 160 | 81.8 | 82.7 | 84.2 | 82.3 | 83.8 | 83.3 | 83.5 | 83.2 | 85.0 | 85.2 | 86.0 | 86.8 | 87.0 | 88.0 | 88.7 | 87.7 | 85.4 | 132.8 |
| 200 | 84.0 | 84.7 | 84.2 | 81.7 | 84.5 | 82.4 | 82.7 | 81.7 | 81.9 | 82.4 | 83.7 | 85.1 | 86.5 | 87.9 | 88.7 | 86.9 | 84.5 | 131.9 |
| 250 | 87.2 | 88.7 | 88.4 | 88.6 | 85.9 | 85.6 | 83.6 | 83.6 | 86.1 | 87.2 | 88.4 | 88.6 | 88.9 | 89.6 | 89.1 | 87.9 | 87.4 | 134.8 |
| 315 | 86.8 | 85.5 | 87.3 | 85.3 | 86.0 | 84.0 | 84.7 | 83.5 | 84.8 | 84.8 | 85.8 | 86.9 | 87.7 | 88.0 | 87.7 | 85.7 | 85.9 | 133.3 |
| 400 | 90.1 | 89.0 | 89.6 | 90.0 | 88.0 | 85.3 | 86.0 | 84.0 | 86.6 | 87.8 | 87.5 | 88.2 | 88.8 | 88.8 | 87.6 | 87.0 | 87.8 | 135.2 |
| 500 | 90.7 | 89.3 | 89.8 | 90.7 | 90.3 | 88.0 | 87.3 | 84.8 | 86.2 | 86.8 | 87.7 | 88.4 | 90.3 | 89.3 | 88.2 | 86.0 | 88.5 | 135.9 |
| 630 | 93.0 | 92.7 | 93.2 | 91.5 | 91.7 | 88.0 | 88.0 | 87.9 | 88.2 | 89.7 | 89.9 | 90.6 | 91.0 | 89.9 | 89.2 | 87.9 | 90.2 | 137.6 |
| 800 | 94.1 | 92.8 | 92.8 | 92.6 | 92.5 | 91.1 | 89.5 | 88.1 | 89.5 | 90.6 | 91.5 | 92.1 | 93.0 | 91.3 | 88.8 | 87.2 | 91.3 | 138.7 |
| 1000 | 96.4 | 95.4 | 94.4 | 96.1 | 95.4 | 93.9 | 91.2 | 90.2 | 90.9 | 91.9 | 93.0 | 94.9 | 96.2 | 93.7 | 90.0 | 88.4 | 93.7 | 141.1 |
| 1250 | 97.8 | 97.5 | 97.0 | 97.5 | 96.5 | 94.5 | 93.0 | 91.2 | 92.0 | 93.0 | 93.8 | 94.9 | 95.8 | 93.0 | 90.8 | 88.6 | 94.7 | 142.1 |
| 1600 | 112.4 | 113.6 | 110.1 | 112.1 | 110.9 | 110.4 | 104.9 | 102.1 | 104.4 | 103.4 | 102.4 | 104.3 | 106.4 | 101.6 | 99.9 | 98.6 | 107.7 | 155.1 |
| 2000 | 99.0 | 99.3 | 98.2 | 99.0 | 98.5 | 98.0 | 94.2 | 93.2 | 94.2 | 94.7 | 96.0 | 97.3 | 99.2 | 94.7 | 92.5 | 90.6 | 96.9 | 144.3 |
| 2500 | 97.2 | 96.9 | 97.6 | 97.2 | 96.7 | 95.4 | 92.4 | 91.9 | 93.6 | 94.2 | 95.6 | 96.5 | 97.7 | 94.6 | 92.1 | 89.1 | 95.7 | 143.1 |
| 3150 | 102.8 | 103.8 | 104.3 | 106.6 | 106.1 | 104.6 | 100.6 | 97.8 | 97.6 | 97.1 | 99.0 | 100.1 | 100.5 | 98.3 | 95.6 | 93.4 | 102.4 | 149.8 |
| 4000 | 97.4 | 98.0 | 98.4 | 99.4 | 98.9 | 97.2 | 93.5 | 91.9 | 93.2 | 94.5 | 96.7 | 97.3 | 98.5 | 95.2 | 93.2 | 90.1 | 97.2 | 144.6 |
| 5000 | 100.7 | 101.0 | 100.4 | 102.4 | 101.5 | 100.7 | 95.7 | 92.5 | 94.9 | 95.4 | 97.2 | 97.6 | 99.5 | 97.2 | 94.9 | 92.0 | 99.5 | 146.9 |
| 6300 | 98.2 | 97.1 | 98.1 | 98.7 | 98.9 | 96.7 | 91.2 | 88.9 | 91.4 | 91.6 | 94.6 | 94.4 | 96.1 | 93.4 | 92.2 | 88.2 | 96.6 | 144.0 |
| 8000 | 95.7 | 96.4 | 97.2 | 97.4 | 97.7 | 95.2 | 90.4 | 87.4 | 90.1 | 91.7 | 94.2 | 93.7 | 94.7 | 91.9 | 90.4 | 86.7 | 96.2 | 143.6 |
| 10000 | 94.3 | 94.6 | 95.5 | 95.1 | 96.5 | 94.3 | 87.4 | 85.0 | 87.3 | 88.3 | 91.3 | 90.8 | 92.8 | 89.8 | 88.1 | 83.6 | 95.2 | 142.6 |
| 12500 | 91.8 | 92.1 | 92.8 | 92.0 | 94.4 | 91.2 | 83.7 | 81.5 | 83.7 | 84.7 | 87.8 | 87.5 | 89.3 | 85.7 | 84.7 | 78.9 | 93.6 | 141.0 |
| 16000 | 89.9 | 89.0 | 90.9 | 88.8 | 92.4 | 87.1 | 78.5 | 77.6 | 80.5 | 80.7 | 83.0 | 84.4 | 82.2 | 81.5 | 75.7 | 72.4 | 92.4 | 139.8 |
| 20000 | 87.2 | 84.4 | 89.8 | 85.1 | 91.1 | 82.0 | 73.8 | 72.3 | 75.2 | 75.8 | 78.1 | 78.9 | 80.3 | 76.5 | 76.6 | 71.1 | 92.5 | 139.9 |
| OVERALL | 114.1 | 115.0 | 112.9 | 114.5 | 113.7 | 112.7 | 108.0 | 105.6 | 107.3 | 107.1 | 107.9 | 109.0 | 110.5 | 107.4 | 106.0 | 104.4 | 111.1 | 158.5 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 101.4 | 109.9 | 112.1 | 116.1 | 117.0 | 117.2 | 113.8 | 112.0 | 113.8 | 113.5 | 114.0 | 114.1 | 114.4 | 109.8 | 105.2 | 99.4 | | |

TABLE V. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4212 rpm; fundamental blade passage frequency, 1825 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 84.3 | 80.1 | 80.6 | 80.6 | 81.1 | 82.8 | 82.8 | 81.9 | 83.3 | 83.4 | 84.1 | 85.5 | 87.1 | 89.3 | 91.8 | 93.7 | 85.8 | 133.2 |
| 63 | 83.8 | 82.0 | 86.7 | 83.2 | 81.7 | 83.3 | 81.0 | 82.0 | 84.0 | 83.2 | 84.3 | 86.1 | 88.0 | 90.3 | 92.8 | 94.7 | 86.7 | 134.1 |
| 80 | 85.5 | 82.5 | 86.5 | 82.5 | 80.8 | 82.3 | 80.5 | 82.2 | 84.7 | 84.8 | 86.7 | 89.1 | 91.2 | 93.5 | 96.0 | 98.5 | 89.3 | 136.7 |
| 100 | 86.7 | 81.2 | 80.5 | 80.8 | 81.5 | 83.5 | 83.3 | 85.0 | 87.0 | 88.0 | 90.0 | 91.6 | 93.3 | 96.0 | 98.2 | 98.2 | 91.0 | 138.4 |
| 125 | 88.2 | 85.2 | 86.2 | 85.5 | 86.0 | 87.8 | 87.8 | 89.7 | 90.7 | 91.8 | 92.6 | 93.8 | 95.7 | 97.8 | 96.9 | 96.9 | 91.7 | 139.1 |
| 160 | 88.3 | 87.5 | 88.6 | 87.5 | 88.3 | 89.3 | 88.6 | 89.0 | 90.0 | 89.8 | 90.8 | 91.4 | 92.5 | 93.8 | 94.8 | 93.5 | 90.7 | 138.1 |
| 200 | 88.5 | 88.5 | 87.5 | 86.6 | 86.0 | 87.1 | 86.0 | 86.3 | 86.8 | 87.3 | 88.6 | 90.7 | 93.1 | 94.3 | 94.5 | 92.7 | 89.7 | 137.1 |
| 250 | 92.0 | 89.5 | 89.4 | 91.9 | 87.5 | 89.4 | 90.9 | 88.7 | 89.2 | 91.7 | 93.5 | 95.3 | 94.0 | 95.0 | 95.2 | 93.6 | 92.2 | 139.6 |
| 315 | 91.1 | 90.2 | 90.4 | 92.4 | 89.2 | 90.9 | 91.7 | 89.9 | 89.9 | 91.2 | 93.2 | 94.5 | 93.7 | 94.4 | 93.6 | 92.3 | 92.1 | 139.5 |
| 400 | 92.1 | 91.1 | 91.0 | 91.6 | 90.3 | 89.3 | 88.5 | 88.3 | 89.8 | 90.0 | 91.0 | 92.5 | 93.1 | 93.5 | 92.6 | 91.2 | 91.1 | 138.5 |
| 500 | 98.3 | 95.3 | 96.0 | 98.1 | 97.6 | 96.8 | 91.8 | 90.8 | 95.3 | 92.3 | 92.3 | 95.9 | 95.8 | 94.1 | 96.0 | 94.8 | 95.3 | 142.7 |
| 630 | 98.6 | 101.1 | 101.6 | 101.1 | 103.6 | 101.1 | 94.6 | 95.8 | 98.1 | 95.3 | 94.1 | 96.7 | 95.6 | 95.0 | 92.6 | 92.5 | 98.6 | 146.0 |
| 800 | 100.8 | 104.1 | 109.6 | 106.8 | 109.3 | 107.1 | 105.5 | 102.9 | 104.3 | 101.9 | 100.9 | 99.9 | 98.6 | 98.6 | 95.3 | 95.3 | 104.7 | 152.1 |
| 1000 | 104.5 | 107.2 | 104.5 | 109.9 | 111.2 | 111.6 | 107.8 | 103.9 | 102.5 | 102.0 | 101.4 | 104.1 | 101.0 | 100.5 | 99.0 | 99.6 | 106.6 | 154.0 |
| 1250 | 104.7 | 106.7 | 107.2 | 108.4 | 110.8 | 111.5 | 109.8 | 104.8 | 102.2 | 99.7 | 99.0 | 101.3 | 100.4 | 99.2 | 97.5 | 97.9 | 106.6 | 154.0 |
| 1600 | 105.2 | 108.2 | 108.2 | 110.6 | 109.6 | 110.1 | 104.7 | 102.1 | 100.6 | 99.6 | 102.1 | 102.7 | 101.6 | 99.4 | 98.1 | 95.5 | 105.8 | 153.2 |
| 2000 | 109.2 | 113.5 | 112.7 | 114.5 | 113.2 | 113.7 | 108.3 | 106.3 | 103.3 | 103.5 | 107.2 | 107.1 | 105.7 | 103.5 | 103.0 | 100.1 | 109.9 | 157.3 |
| 2500 | 102.1 | 104.1 | 105.0 | 104.8 | 104.8 | 103.3 | 99.6 | 97.6 | 98.1 | 98.1 | 99.5 | 99.4 | 100.3 | 96.6 | 96.0 | 93.2 | 101.5 | 148.9 |
| 3150 | 102.6 | 104.6 | 104.9 | 105.6 | 105.4 | 104.3 | 99.9 | 98.6 | 98.9 | 99.6 | 100.9 | 101.5 | 101.9 | 97.9 | 97.3 | 94.0 | 102.6 | 150.0 |
| 4000 | 102.8 | 105.1 | 104.9 | 106.6 | 105.9 | 104.9 | 99.9 | 98.1 | 98.8 | 100.3 | 102.3 | 102.2 | 103.8 | 99.6 | 98.5 | 95.5 | 103.5 | 150.9 |
| 5000 | 100.8 | 102.8 | 101.8 | 103.6 | 102.3 | 102.5 | 97.1 | 95.6 | 98.3 | 98.3 | 100.3 | 100.6 | 101.8 | 98.1 | 97.1 | 94.4 | 101.4 | 148.8 |
| 6300 | 99.7 | 100.2 | 99.9 | 101.5 | 100.6 | 100.5 | 95.2 | 93.0 | 95.7 | 95.9 | 98.6 | 98.2 | 99.6 | 96.8 | 96.1 | 91.9 | 99.8 | 147.2 |
| 8000 | 97.7 | 99.2 | 99.5 | 99.9 | 100.1 | 99.2 | 94.7 | 92.2 | 94.9 | 96.4 | 99.1 | 98.4 | 98.9 | 95.0 | 94.9 | 90.5 | 99.8 | 147.2 |
| 10000 | 95.9 | 97.2 | 96.7 | 97.7 | 98.6 | 97.5 | 91.4 | 89.4 | 91.9 | 92.9 | 96.0 | 95.0 | 96.4 | 92.2 | 91.9 | 87.5 | 98.3 | 145.7 |
| 12500 | 94.1 | 94.7 | 93.9 | 95.1 | 96.6 | 94.9 | 87.6 | 86.2 | 87.8 | 89.7 | 92.6 | 91.3 | 93.3 | 88.8 | 88.5 | 82.8 | 96.8 | 144.2 |
| 16000 | 92.5 | 91.3 | 91.8 | 92.0 | 95.3 | 92.8 | 82.7 | 82.3 | 84.8 | 85.7 | 87.7 | 87.2 | 88.9 | 85.2 | 85.4 | 79.7 | 95.9 | 143.3 |
| 20000 | 88.5 | 86.2 | 89.5 | 88.9 | 94.7 | 89.7 | 79.2 | 76.7 | 79.9 | 81.0 | 83.7 | 83.5 | 85.9 | 79.9 | 80.5 | 74.8 | 96.1 | 143.5 |
| OVERALL | 114.7 | 117.6 | 117.7 | 119.1 | 119.2 | 119.2 | 115.3 | 112.3 | 111.7 | 111.1 | 112.8 | 113.3 | 113.0 | 111.0 | 110.6 | 109.3 | 115.9 | 163.3 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 102.2 | 113.2 | 117.0 | 121.0 | 122.2 | 123.4 | 119.6 | 118.1 | 117.3 | 117.1 | 119.1 | 118.6 | 117.1 | 113.1 | 110.1 | 103.8 | | |

(d) Percent of design speed, 90; fan physical speed, 4738 rpm; fundamental blade passage frequency, 2053 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 84.9 | 82.4 | 84.9 | 84.0 | 84.5 | 85.2 | 85.5 | 86.9 | 86.7 | 88.4 | 89.4 | 89.1 | 90.7 | 92.7 | 95.0 | 97.6 | 136.9 | |
| 63 | 82.6 | 83.8 | 83.3 | 83.8 | 84.1 | 83.6 | 84.3 | 84.1 | 85.5 | 86.6 | 88.6 | 88.7 | 91.5 | 94.0 | 96.6 | 98.8 | 137.3 | |
| 80 | 88.9 | 86.2 | 90.0 | 88.9 | 88.5 | 87.5 | 88.2 | 87.7 | 88.4 | 89.2 | 91.7 | 91.8 | 94.9 | 97.0 | 100.5 | 102.6 | 140.9 | |
| 100 | 85.3 | 83.8 | 85.5 | 84.8 | 85.3 | 86.3 | 86.8 | 88.6 | 90.3 | 91.8 | 94.3 | 95.1 | 97.1 | 99.6 | 102.1 | 103.3 | 142.6 | |
| 125 | 90.0 | 88.9 | 90.0 | 89.6 | 89.9 | 90.5 | 91.2 | 92.2 | 93.5 | 94.4 | 96.2 | 96.8 | 98.4 | 100.5 | 101.9 | 101.9 | 143.4 | |
| 160 | 91.4 | 90.2 | 92.4 | 93.7 | 92.5 | 93.5 | 94.0 | 94.2 | 95.4 | 94.7 | 96.2 | 96.1 | 97.2 | 99.0 | 99.4 | 99.8 | 143.1 | |
| 200 | 89.0 | 90.3 | 90.5 | 91.3 | 91.0 | 90.7 | 90.8 | 90.8 | 91.2 | 92.2 | 93.0 | 94.3 | 96.3 | 98.0 | 99.3 | 98.7 | 141.3 | |
| 250 | 90.6 | 95.0 | 94.1 | 96.8 | 94.8 | 94.1 | 92.0 | 91.8 | 93.3 | 93.8 | 96.3 | 97.1 | 99.1 | 99.6 | 100.3 | 99.7 | 143.6 | |
| 315 | 97.7 | 96.2 | 103.7 | 100.2 | 99.4 | 96.2 | 94.9 | 94.4 | 94.7 | 95.6 | 96.9 | 98.2 | 99.1 | 100.7 | 100.9 | 100.9 | 145.8 | |
| 400 | 96.3 | 98.9 | 99.8 | 105.3 | 105.6 | 104.1 | 102.8 | 100.4 | 100.3 | 99.6 | 99.4 | 99.2 | 99.3 | 99.3 | 99.6 | 98.3 | 149.1 | |
| 500 | 103.0 | 107.0 | 111.5 | 115.3 | 115.5 | 112.8 | 111.3 | 107.8 | 105.0 | 107.1 | 105.6 | 107.9 | 102.1 | 105.6 | 102.3 | 103.5 | 157.6 | |
| 630 | 104.1 | 106.6 | 108.1 | 110.1 | 110.0 | 108.6 | 107.0 | 102.1 | 101.1 | 103.8 | 102.6 | 104.2 | 100.8 | 101.8 | 101.0 | 100.7 | 153.3 | |
| 800 | 103.3 | 106.0 | 110.2 | 111.7 | 114.8 | 113.7 | 113.7 | 107.5 | 108.0 | 103.5 | 103.5 | 103.6 | 101.3 | 100.3 | 102.2 | 101.9 | 157.1 | |
| 1000 | 104.1 | 104.9 | 107.0 | 107.7 | 110.7 | 110.5 | 107.5 | 101.5 | 102.0 | 100.4 | 99.7 | 100.8 | 100.4 | 99.5 | 99.9 | 98.6 | 153.0 | |
| 1250 | 107.2 | 106.5 | 108.7 | 109.7 | 110.5 | 111.5 | 108.8 | 103.2 | 103.8 | 102.5 | 101.2 | 102.3 | 101.2 | 100.5 | 100.8 | 99.0 | 154.2 | |
| 1600 | 104.8 | 105.4 | 105.1 | 106.8 | 106.8 | 107.8 | 104.4 | 100.9 | 100.8 | 99.8 | 99.3 | 99.7 | 100.3 | 98.9 | 98.6 | 97.3 | 151.0 | |
| 2000 | 108.5 | 110.4 | 109.2 | 109.0 | 109.4 | 109.0 | 107.0 | 104.2 | 106.0 | 105.5 | 106.5 | 107.8 | 108.4 | 105.4 | 105.0 | 102.6 | 107.7 | |
| 2500 | 104.3 | 105.3 | 106.2 | 106.0 | 105.5 | 106.2 | 103.5 | 99.5 | 100.3 | 100.0 | 100.3 | 100.9 | 101.5 | 99.5 | 99.8 | 97.2 | 150.7 | |
| 3150 | 102.9 | 103.9 | 104.8 | 104.8 | 105.0 | 104.3 | 103.0 | 99.1 | 100.1 | 100.5 | 101.0 | 101.6 | 101.6 | 99.1 | 98.6 | 96.2 | 150.2 | |
| 4000 | 102.8 | 103.8 | 104.1 | 104.9 | 105.4 | 104.3 | 103.4 | 100.6 | 101.9 | 102.8 | 104.1 | 104.4 | 105.4 | 102.3 | 102.9 | 98.8 | 151.8 | |
| 5000 | 101.2 | 102.7 | 102.2 | 103.4 | 102.9 | 102.7 | 101.1 | 97.6 | 99.1 | 99.9 | 100.2 | 100.5 | 101.2 | 98.9 | 99.6 | 96.2 | 149.4 | |
| 6300 | 99.8 | 100.1 | 100.5 | 101.1 | 101.0 | 100.8 | 99.0 | 96.2 | 97.8 | 99.8 | 100.2 | 100.5 | 101.7 | 98.8 | 99.8 | 95.6 | 148.8 | |
| 8000 | 97.6 | 98.3 | 99.5 | 99.8 | 100.8 | 100.1 | 98.5 | 95.6 | 97.3 | 99.8 | 100.3 | 100.6 | 101.3 | 98.1 | 98.3 | 94.4 | 148.9 | |
| 10000 | 95.4 | 96.1 | 97.0 | 97.9 | 98.9 | 98.4 | 96.9 | 93.2 | 95.0 | 96.4 | 97.7 | 97.5 | 99.2 | 95.9 | 96.2 | 91.7 | 147.6 | |
| 12500 | 92.4 | 93.6 | 93.7 | 94.9 | 96.1 | 95.8 | 94.8 | 90.8 | 91.7 | 94.2 | 94.5 | 94.7 | 96.5 | 92.8 | 93.8 | 88.0 | 146.2 | |
| 16000 | 89.8 | 90.6 | 90.8 | 92.5 | 94.0 | 93.3 | 92.5 | 87.5 | 88.8 | 89.7 | 91.1 | 90.9 | 92.3 | 89.6 | 90.5 | 85.3 | 145.1 | |
| 20000 | 85.1 | 85.9 | 87.1 | 88.8 | 91.9 | 90.1 | 91.4 | 84.5 | 84.8 | 86.1 | 86.8 | 87.4 | 88.4 | 85.1 | 85.9 | 81.0 | 144.7 | |
| OVERALL | 115.6 | 117.0 | 118.7 | 120.3 | 121.3 | 120.3 | 118.8 | 114.4 | 114.6 | 114.4 | 114.4 | 115.4 | 115.0 | 114.2 | 114.4 | 113.7 | 165.1 | |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 102.7 | 112.2 | 116.6 | 119.7 | 121.9 | 122.6 | 121.6 | 118.9 | 120.1 | 119.9 | 120.1 | 120.1 | 119.2 | 115.7 | 113.3 | 107.5 |
| 305 METERS | 76.5 | 90.8 | 97.2 | 102.1 | 104.5 | 105.1 | 104.7 | 101.7 | 102.9 | 102.5 | 102.5 | 102.4 | 101.0 | 97.3 | 93.9 | 86.9 |

TABLE VI. - NOISE OF FAN C CONFIGURATION 303 (HARD INLET, FORE-ROTOR-TREATED FAN FRAME, HARD EXHAUST, NOMINAL

NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.0002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3150 rpm; fundamental blade passage frequency, 1365 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 79.7 | 81.0 | 78.0 | 83.2 | 78.8 | 81.0 | 82.3 | 76.7 | 80.2 | 78.3 | 77.3 | 78.6 | 79.2 | 80.0 | 81.2 | 83.4 | 80.1 | 127.5 |
| 63 | 72.4 | 73.4 | 72.7 | 75.1 | 75.7 | 75.7 | 75.2 | 73.2 | 74.9 | 75.7 | 76.4 | 76.8 | 79.4 | 79.7 | 81.6 | 82.6 | 77.0 | 124.4 |
| 80 | 73.6 | 74.3 | 74.1 | 74.5 | 77.6 | 76.0 | 75.8 | 74.1 | 76.5 | 76.5 | 78.1 | 78.6 | 82.5 | 82.3 | 84.3 | 85.4 | 79.0 | 126.4 |
| 100 | 80.7 | 77.5 | 79.8 | 81.2 | 83.0 | 80.0 | 79.3 | 78.0 | 79.5 | 80.3 | 82.0 | 82.3 | 84.3 | 84.8 | 86.3 | 86.7 | 82.1 | 129.5 |
| 125 | 79.7 | 80.0 | 79.5 | 80.4 | 80.0 | 78.5 | 79.5 | 79.4 | 81.4 | 81.9 | 82.5 | 83.6 | 84.5 | 84.7 | 86.7 | 85.9 | 82.3 | 129.7 |
| 160 | 81.8 | 81.8 | 82.5 | 82.2 | 83.7 | 82.2 | 79.3 | 81.2 | 81.8 | 81.8 | 82.7 | 82.9 | 83.0 | 83.0 | 84.0 | 84.4 | 82.4 | 129.8 |
| 200 | 84.5 | 85.0 | 86.4 | 84.5 | 84.0 | 81.0 | 79.0 | 78.5 | 78.4 | 79.4 | 79.2 | 79.8 | 82.2 | 83.0 | 83.2 | 82.7 | 81.9 | 129.3 |
| 250 | 84.2 | 84.3 | 82.8 | 82.7 | 80.8 | 79.7 | 78.2 | 80.0 | 80.8 | 81.5 | 82.6 | 83.8 | 84.2 | 83.5 | 81.7 | 81.7 | 82.0 | 129.4 |
| 315 | 83.1 | 83.9 | 82.3 | 82.3 | 81.6 | 79.8 | 80.3 | 79.3 | 80.4 | 81.4 | 81.3 | 82.4 | 82.8 | 83.3 | 82.6 | 81.0 | 81.6 | 129.0 |
| 400 | 85.2 | 85.8 | 84.7 | 83.5 | 83.2 | 79.7 | 79.7 | 79.5 | 81.3 | 82.7 | 82.5 | 83.9 | 85.2 | 84.3 | 82.8 | 80.5 | 82.9 | 130.3 |
| 500 | 86.3 | 86.3 | 85.7 | 85.5 | 84.3 | 81.2 | 80.5 | 81.3 | 81.7 | 83.3 | 83.7 | 84.9 | 85.2 | 84.8 | 83.3 | 80.6 | 83.8 | 131.2 |
| 630 | 88.0 | 88.0 | 86.8 | 86.3 | 84.5 | 82.1 | 81.0 | 81.6 | 82.8 | 84.5 | 85.5 | 86.4 | 87.5 | 87.0 | 84.1 | 82.0 | 85.1 | 132.5 |
| 800 | 89.9 | 90.0 | 88.0 | 87.7 | 86.7 | 84.5 | 83.7 | 83.5 | 85.0 | 86.4 | 87.4 | 88.6 | 90.0 | 88.9 | 85.0 | 83.3 | 87.1 | 134.5 |
| 1000 | 91.0 | 91.3 | 90.3 | 89.1 | 87.8 | 85.5 | 85.0 | 85.3 | 87.0 | 88.3 | 89.1 | 90.7 | 91.3 | 90.3 | 86.5 | 84.5 | 88.8 | 136.2 |
| 1250 | 93.4 | 97.9 | 99.5 | 98.2 | 100.5 | 96.5 | 92.7 | 90.4 | 91.4 | 92.9 | 94.0 | 96.1 | 96.9 | 95.5 | 90.9 | 88.1 | 96.1 | 143.5 |
| 1600 | 94.6 | 94.4 | 94.9 | 94.2 | 95.4 | 91.1 | 87.9 | 87.6 | 89.4 | 91.2 | 92.1 | 93.3 | 94.7 | 92.6 | 88.7 | 85.8 | 92.5 | 139.9 |
| 2000 | 91.2 | 92.3 | 91.5 | 90.8 | 88.3 | 86.5 | 85.3 | 86.5 | 89.3 | 90.8 | 92.2 | 93.6 | 94.7 | 91.8 | 88.5 | 84.9 | 91.0 | 138.4 |
| 2500 | 94.5 | 96.0 | 94.8 | 95.0 | 94.0 | 89.6 | 86.5 | 87.0 | 90.1 | 92.6 | 92.3 | 94.1 | 96.0 | 94.1 | 90.3 | 85.2 | 93.1 | 140.5 |
| 3150 | 91.9 | 93.6 | 93.1 | 92.6 | 90.9 | 87.1 | 84.2 | 85.4 | 88.7 | 91.2 | 92.1 | 94.0 | 95.1 | 92.9 | 89.6 | 84.6 | 91.9 | 139.3 |
| 4000 | 93.0 | 94.5 | 95.3 | 96.0 | 93.0 | 90.2 | 85.5 | 86.0 | 90.3 | 92.7 | 94.2 | 95.8 | 96.5 | 93.8 | 90.0 | 85.6 | 93.9 | 141.3 |
| 5000 | 92.5 | 94.2 | 92.7 | 93.3 | 90.8 | 88.2 | 83.2 | 84.2 | 88.7 | 89.5 | 91.0 | 92.6 | 94.2 | 92.7 | 89.3 | 83.6 | 91.9 | 139.3 |
| 6300 | 91.9 | 92.4 | 92.2 | 92.0 | 89.9 | 87.4 | 81.0 | 81.4 | 86.1 | 87.0 | 88.9 | 89.8 | 91.6 | 89.6 | 87.1 | 80.9 | 90.4 | 137.8 |
| 8000 | 90.4 | 92.3 | 92.3 | 91.6 | 90.0 | 87.3 | 80.2 | 80.1 | 84.7 | 86.4 | 88.1 | 89.3 | 90.6 | 88.2 | 84.9 | 80.4 | 90.5 | 137.9 |
| 10000 | 89.8 | 91.7 | 91.0 | 90.6 | 89.0 | 87.0 | 78.4 | 77.9 | 82.8 | 83.8 | 85.6 | 86.7 | 89.1 | 86.1 | 83.5 | 77.5 | 90.0 | 137.4 |
| 12500 | 88.1 | 89.9 | 88.6 | 88.6 | 87.1 | 84.4 | 75.2 | 74.7 | 78.7 | 81.0 | 82.3 | 83.3 | 85.8 | 82.5 | 80.3 | 74.8 | 88.8 | 136.2 |
| 16000 | 85.9 | 86.9 | 85.7 | 85.7 | 83.0 | 80.8 | 69.4 | 69.3 | 75.3 | 76.3 | 77.4 | 78.5 | 80.1 | 78.6 | 77.0 | 70.6 | 87.0 | 134.4 |
| 20000 | 81.5 | 81.7 | 81.8 | 81.8 | 79.0 | 74.9 | 64.6 | 64.2 | 69.4 | 71.2 | 72.4 | 74.3 | 75.5 | 72.9 | 72.1 | 64.6 | 85.2 | 132.6 |
| OVERALL | 104.9 | 105.3 | 105.3 | 104.9 | 104.6 | 101.2 | 97.9 | 97.4 | 99.9 | 101.6 | 102.6 | 104.1 | 105.4 | 103.6 | 100.6 | 97.9 | 103.6 | 151.0 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 90.6 | 100.1 | 103.9 | 106.8 | 107.1 | 105.3 | 102.6 | 103.2 | 106.6 | 108.3 | 109.0 | 109.7 | 109.4 | 105.6 | 99.8 | 91.8 | | |
| 113 METERS | 82.2 | 92.4 | 96.6 | 99.6 | 100.5 | 98.6 | 96.3 | 97.0 | 100.1 | 101.8 | 102.4 | 103.0 | 102.6 | 98.9 | 92.8 | 84.3 | | |

DISTANCE

SIDELINE PERCEIVED NOISE LEVELS

| | | | | | | | | | | | | | | | | |
|------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
| 61 METERS | 90.6 | 100.1 | 103.9 | 106.8 | 107.1 | 105.3 | 102.6 | 103.2 | 106.6 | 108.3 | 109.0 | 109.7 | 109.4 | 105.6 | 99.8 | 91.8 |
| 113 METERS | 82.2 | 92.4 | 96.6 | 99.6 | 100.5 | 98.6 | 96.3 | 97.0 | 100.1 | 101.8 | 102.4 | 103.0 | 102.6 | 98.9 | 92.8 | 84.3 |

(b) Percent of design speed, 70; fan physical speed, 3675 rpm; fundamental blade passage frequency, 1592 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 78.3 | 76.0 | 77.8 | 77.3 | 77.2 | 78.5 | 78.7 | 79.0 | 79.7 | 80.5 | 80.3 | 82.6 | 83.7 | 85.2 | 87.0 | 89.4 | 81.9 | 129.3 |
| 63 | 84.7 | 84.2 | 86.3 | 85.5 | 81.3 | 84.0 | 82.7 | 84.0 | 80.8 | 83.3 | 86.8 | 82.4 | 87.8 | 86.5 | 87.7 | 90.0 | 85.1 | 132.5 |
| 80 | 76.3 | 76.3 | 74.8 | 74.8 | 75.8 | 75.6 | 76.5 | 77.0 | 78.0 | 80.0 | 82.0 | 84.2 | 86.6 | 88.6 | 90.5 | 91.8 | 83.7 | 131.1 |
| 100 | 78.1 | 78.0 | 76.6 | 76.8 | 78.1 | 80.0 | 79.6 | 80.1 | 81.8 | 83.6 | 85.3 | 87.6 | 88.6 | 91.0 | 92.6 | 93.2 | 86.1 | 133.5 |
| 125 | 87.7 | 86.7 | 85.0 | 85.0 | 87.9 | 87.9 | 87.0 | 85.7 | 86.5 | 86.7 | 87.9 | 89.3 | 90.4 | 91.4 | 93.4 | 92.7 | 88.6 | 136.0 |
| 160 | 92.0 | 92.9 | 83.5 | 82.5 | 83.2 | 83.5 | 84.0 | 84.2 | 85.7 | 86.2 | 86.4 | 88.0 | 89.0 | 89.0 | 89.9 | 89.3 | 86.2 | 133.6 |
| 200 | 83.8 | 84.8 | 84.0 | 82.5 | 82.5 | 81.8 | 82.1 | 82.3 | 83.3 | 84.8 | 85.3 | 85.5 | 87.5 | 88.5 | 89.3 | 88.3 | 85.1 | 132.5 |
| 250 | 86.5 | 86.8 | 86.0 | 85.2 | 85.2 | 83.5 | 81.7 | 82.7 | 84.2 | 85.5 | 86.3 | 88.8 | 89.7 | 89.7 | 89.5 | 87.4 | 86.4 | 133.8 |
| 315 | 86.9 | 86.6 | 85.6 | 85.4 | 83.7 | 83.6 | 83.9 | 84.2 | 85.4 | 86.1 | 86.7 | 87.5 | 88.6 | 88.7 | 88.4 | 85.8 | 86.2 | 133.6 |
| 400 | 88.6 | 90.6 | 90.1 | 92.4 | 86.4 | 86.1 | 85.6 | 86.6 | 85.6 | 88.6 | 87.4 | 89.7 | 91.4 | 89.4 | 88.1 | 87.3 | 88.7 | 136.1 |
| 500 | 90.4 | 90.2 | 89.2 | 89.2 | 87.9 | 84.9 | 86.1 | 85.6 | 85.7 | 86.7 | 87.7 | 88.8 | 90.6 | 89.6 | 87.9 | 85.3 | 88.0 | 135.4 |
| 630 | 92.2 | 92.5 | 92.9 | 90.9 | 91.5 | 90.2 | 86.2 | 86.7 | 88.5 | 89.2 | 90.2 | 91.4 | 91.9 | 91.5 | 88.5 | 86.1 | 90.3 | 137.7 |
| 800 | 92.2 | 92.3 | 91.2 | 90.8 | 90.2 | 89.8 | 87.3 | 87.5 | 88.3 | 89.8 | 91.5 | 92.2 | 94.2 | 92.0 | 88.8 | 86.5 | 90.7 | 138.1 |
| 1000 | 93.8 | 94.5 | 93.6 | 95.7 | 93.4 | 91.7 | 90.7 | 91.8 | 91.2 | 92.3 | 93.8 | 94.8 | 96.8 | 94.3 | 90.3 | 86.9 | 93.5 | 140.9 |
| 1250 | 94.9 | 95.7 | 95.5 | 96.7 | 94.9 | 91.7 | 91.4 | 90.5 | 92.5 | 92.7 | 94.2 | 95.5 | 96.2 | 93.4 | 90.0 | 87.7 | 94.0 | 141.4 |
| 1600 | 105.4 | 105.4 | 108.7 | 113.6 | 108.6 | 105.4 | 102.9 | 100.1 | 100.1 | 101.1 | 101.9 | 104.3 | 101.7 | 100.9 | 97.7 | 96.8 | 105.7 | 153.1 |
| 2000 | 95.2 | 96.0 | 96.2 | 97.7 | 94.8 | 92.8 | 90.7 | 91.8 | 93.3 | 94.7 | 96.2 | 97.4 | 98.2 | 94.0 | 90.7 | 88.2 | 95.3 | 142.7 |
| 2500 | 94.8 | 95.8 | 95.5 | 94.8 | 93.6 | 92.0 | 89.3 | 90.4 | 93.6 | 94.8 | 95.6 | 96.5 | 97.9 | 94.1 | 90.8 | 86.9 | 94.7 | 142.1 |
| 3150 | 100.2 | 102.7 | 103.0 | 102.7 | 102.0 | 99.2 | 94.5 | 93.3 | 95.5 | 97.3 | 98.5 | 100.6 | 102.7 | 103.3 | 99.5 | 91.8 | 100.6 | 148.0 |
| 4000 | 95.8 | 97.1 | 97.1 | 96.6 | 95.6 | 93.5 | 89.6 | 90.5 | 93.7 | 95.3 | 96.8 | 98.3 | 99.2 | 95.0 | 91.5 | 87.6 | 96.3 | 143.7 |
| 5000 | 99.4 | 100.4 | 98.4 | 100.2 | 98.7 | 96.7 | 91.7 | 90.9 | 94.7 | 95.9 | 98.2 | 99.2 | 102.6 | 98.1 | 94.7 | 90.2 | 98.9 | 146.3 |
| 6300 | 96.2 | 96.3 | 96.7 | 96.6 | 95.6 | 93.9 | 87.6 | 87.4 | 91.8 | 92.4 | 94.4 | 95.1 | 97.2 | 93.2 | 91.1 | 85.1 | 95.5 | 142.9 |
| 8000 | 93.5 | 95.4 | 96.5 | 95.7 | 95.0 | 93.4 | 86.3 | 86.0 | 90.2 | 92.0 | 93.7 | 95.0 | 96.2 | 91.7 | 89.2 | 84.5 | 95.4 | 142.8 |
| 10000 | 92.5 | 94.5 | 94.1 | 94.4 | 93.4 | 92.1 | 84.2 | 83.9 | 88.2 | 89.4 | 91.8 | 92.6 | 94.4 | 90.1 | 87.3 | 82.0 | 94.6 | 142.0 |
| 12500 | 90.4 | 92.0 | 91.3 | 91.5 | 90.8 | 89.1 | 80.4 | 80.8 | 84.3 | 86.6 | 88.1 | 89.2 | 91.4 | 86.8 | 84.2 | 79.3 | 92.9 | 140.3 |
| 16000 | 87.7 | 88.9 | 87.7 | 88.5 | 86.7 | 84.9 | 74.6 | 75.4 | 80.6 | 81.9 | 83.3 | 84.6 | 86.3 | 83.3 | 81.4 | 74.9 | 90.8 | 138.2 |
| 20000 | 83.2 | 83.6 | 83.9 | 84.2 | 82.7 | 78.9 | 69.6 | 69.9 | 74.2 | 76.8 | 78.3 | 80.2 | 81.5 | 77.6 | 76.5 | 69.0 | 88.8 | 136.2 |
| OVERALL | 109.4 | 110.2 | 111.5 | 114.7 | 111.0 | 108.3 | 105.3 | 103.9 | 105.4 | 106.6 | 107.9 | 109.5 | 110.3 | 108.5 | 105.9 | 103.5 | 109.7 | 157.1 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 96.6 | 105.4 | 110.7 | 116.1 | 114.5 | 113.2 | 111.2 | 110.3 | 111.7 | 113.1 | 113.9 | 114.7 | 115.0 | 112.3 | 106.6 | 98.1 | | |

TABLE VI. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4200 rpm; fundamental blade passage frequency, 1820 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| 50 | 32.7 | 80.4 | 81.4 | 80.6 | 81.4 | 82.4 | 82.7 | 82.7 | 84.1 | 84.2 | 86.2 | 86.7 | 87.7 | 89.9 | 92.9 | 94.4 | 134.0 |
| 63 | 36.7 | 83.4 | 86.9 | 82.2 | 82.7 | 81.4 | 83.1 | 83.2 | 85.4 | 86.1 | 85.7 | 87.8 | 88.7 | 90.9 | 93.6 | 95.4 | 135.0 |
| 80 | 35.8 | 82.8 | 85.8 | 80.8 | 81.5 | 80.8 | 81.8 | 82.5 | 85.0 | 85.8 | 86.8 | 89.8 | 91.5 | 94.7 | 96.7 | 98.7 | 137.2 |
| 100 | 82.7 | 81.9 | 81.4 | 81.4 | 81.0 | 82.5 | 82.5 | 84.7 | 86.9 | 88.7 | 90.4 | 92.5 | 94.5 | 96.7 | 99.2 | 99.4 | 139.2 |
| 125 | 86.9 | 85.9 | 86.4 | 85.4 | 86.1 | 87.4 | 87.1 | 88.6 | 89.2 | 91.2 | 92.9 | 94.0 | 95.1 | 97.1 | 99.2 | 98.3 | 140.1 |
| 160 | 86.6 | 87.6 | 88.1 | 87.4 | 88.4 | 88.6 | 88.4 | 89.9 | 90.1 | 91.3 | 91.4 | 93.2 | 93.8 | 94.9 | 95.8 | 94.8 | 138.9 |
| 200 | 87.7 | 90.0 | 88.2 | 86.9 | 86.9 | 86.9 | 86.7 | 86.7 | 87.2 | 88.7 | 89.4 | 91.4 | 93.2 | 94.4 | 95.7 | 93.7 | 137.7 |
| 250 | 89.0 | 90.5 | 89.9 | 90.0 | 91.4 | 88.5 | 90.2 | 88.2 | 90.9 | 91.2 | 93.7 | 95.6 | 94.7 | 95.7 | 96.2 | 94.4 | 140.0 |
| 315 | 89.5 | 91.2 | 91.9 | 91.0 | 91.0 | 88.7 | 90.7 | 89.5 | 91.2 | 91.5 | 93.0 | 94.6 | 94.5 | 94.7 | 94.7 | 92.8 | 139.7 |
| 400 | 90.3 | 89.8 | 93.2 | 92.8 | 92.0 | 89.2 | 89.2 | 88.3 | 92.0 | 90.8 | 91.7 | 94.2 | 94.0 | 94.5 | 93.5 | 90.7 | 139.5 |
| 500 | 98.0 | 95.8 | 101.8 | 103.3 | 101.3 | 95.0 | 94.0 | 95.8 | 94.0 | 96.8 | 93.7 | 97.3 | 95.5 | 95.2 | 95.7 | 93.6 | 145.1 |
| 630 | 96.6 | 98.6 | 103.1 | 106.9 | 103.7 | 100.4 | 98.7 | 100.1 | 94.6 | 96.6 | 98.1 | 96.3 | 97.4 | 94.7 | 96.6 | 91.8 | 147.6 |
| 800 | 99.8 | 102.0 | 107.1 | 107.1 | 110.6 | 108.3 | 104.4 | 102.9 | 97.8 | 98.4 | 100.4 | 98.7 | 98.9 | 99.1 | 97.4 | 92.5 | 151.8 |
| 1000 | 100.8 | 103.8 | 106.3 | 107.3 | 113.1 | 108.9 | 102.4 | 98.6 | 96.9 | 98.8 | 96.9 | 100.7 | 100.1 | 97.9 | 97.4 | 94.2 | 152.4 |
| 1250 | 100.0 | 102.0 | 104.0 | 106.0 | 114.0 | 109.9 | 104.7 | 100.9 | 99.9 | 98.2 | 98.4 | 101.1 | 99.2 | 98.0 | 95.4 | 93.6 | 153.2 |
| 1600 | 105.6 | 107.0 | 108.3 | 109.5 | 111.8 | 107.8 | 102.8 | 100.8 | 99.5 | 100.1 | 103.3 | 102.1 | 103.0 | 99.3 | 97.1 | 96.5 | 153.0 |
| 2000 | 110.5 | 112.3 | 113.1 | 113.6 | 115.5 | 112.1 | 106.1 | 104.8 | 103.0 | 103.1 | 108.0 | 106.1 | 107.1 | 103.1 | 101.1 | 100.9 | 157.2 |
| 2500 | 101.0 | 102.3 | 103.5 | 104.5 | 106.5 | 103.3 | 98.8 | 97.0 | 98.2 | 98.7 | 99.7 | 99.9 | 100.0 | 96.0 | 94.0 | 91.2 | 148.9 |
| 3150 | 100.6 | 102.6 | 103.9 | 103.6 | 105.2 | 102.1 | 97.9 | 96.9 | 98.6 | 100.4 | 101.6 | 102.2 | 101.7 | 97.9 | 94.1 | 92.0 | 149.2 |
| 4000 | 100.2 | 100.0 | 105.3 | 105.2 | 105.7 | 103.7 | 98.2 | 96.8 | 98.7 | 101.3 | 102.7 | 103.3 | 103.9 | 100.3 | 95.5 | 92.8 | 150.6 |
| 5000 | 100.0 | 101.5 | 101.7 | 103.3 | 102.3 | 101.0 | 95.8 | 94.8 | 97.8 | 99.0 | 100.5 | 100.8 | 102.5 | 97.5 | 95.5 | 91.0 | 148.5 |
| 6300 | 98.6 | 98.8 | 99.9 | 100.5 | 100.6 | 98.5 | 93.5 | 92.0 | 95.1 | 96.4 | 98.2 | 98.7 | 100.2 | 95.9 | 93.7 | 88.7 | 146.7 |
| 8000 | 96.7 | 98.3 | 99.8 | 99.7 | 100.2 | 98.2 | 92.7 | 91.3 | 94.8 | 97.4 | 98.5 | 99.4 | 100.2 | 95.5 | 92.8 | 89.0 | 147.2 |
| 10000 | 95.0 | 96.5 | 96.9 | 98.0 | 98.5 | 96.6 | 90.3 | 88.6 | 92.6 | 94.4 | 96.3 | 96.2 | 98.3 | 93.3 | 90.5 | 85.9 | 146.0 |
| 12500 | 92.4 | 93.7 | 93.9 | 94.8 | 95.8 | 93.7 | 86.6 | 85.7 | 88.7 | 91.2 | 93.0 | 93.6 | 95.2 | 90.2 | 87.9 | 83.3 | 144.3 |
| 16000 | 89.5 | 90.3 | 91.0 | 91.7 | 92.3 | 90.3 | 81.4 | 80.3 | 85.0 | 87.2 | 88.4 | 89.1 | 90.2 | 87.0 | 84.8 | 78.8 | 142.4 |
| 20000 | 85.0 | 85.5 | 87.5 | 88.7 | 89.9 | 86.0 | 78.0 | 74.7 | 79.0 | 82.0 | 83.6 | 85.1 | 86.1 | 81.5 | 79.9 | 73.3 | 141.3 |
| OVERALL | 114.4 | 115.9 | 117.3 | 118.3 | 121.1 | 117.6 | 112.5 | 110.9 | 110.0 | 111.0 | 113.1 | 113.0 | 113.6 | 110.9 | 110.1 | 108.8 | 115.5 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | |
| 61 METERS | 102.3 | 111.9 | 117.1 | 120.4 | 123.9 | 121.9 | 117.8 | 116.9 | 116.6 | 117.5 | 119.5 | 118.3 | 117.8 | 113.0 | 108.9 | 103.5 | |

(d) Percent of design speed, 90; fan physical speed, 4720 rpm; fundamental blade passage frequency, 2045 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 86.9 | 83.4 | 84.7 | 84.9 | 85.7 | 86.7 | 86.4 | 86.9 | 88.7 | 88.7 | 89.9 | 92.2 | 93.4 | 95.2 | 98.4 | 102.3 | 92.3 | |
| 63 | 82.9 | 84.9 | 84.9 | 84.4 | 84.9 | 85.1 | 85.6 | 85.9 | 86.9 | 87.4 | 89.4 | 90.9 | 93.9 | 96.4 | 99.1 | 101.5 | 92.1 | |
| 80 | 91.7 | 92.9 | 95.4 | 92.2 | 87.2 | 85.2 | 88.2 | 89.2 | 87.7 | 91.2 | 93.4 | 95.2 | 97.9 | 99.9 | 103.2 | 105.3 | 96.1 | |
| 100 | 86.7 | 84.9 | 85.7 | 85.9 | 85.4 | 86.2 | 87.7 | 89.4 | 91.9 | 93.7 | 95.4 | 98.4 | 99.9 | 102.9 | 105.4 | 105.8 | 97.7 | |
| 125 | 91.2 | 89.4 | 89.9 | 89.4 | 90.7 | 91.2 | 91.4 | 92.9 | 94.9 | 95.9 | 97.4 | 99.7 | 100.7 | 103.2 | 104.9 | 104.3 | 98.2 | |
| 160 | 91.7 | 93.5 | 94.5 | 92.7 | 94.0 | 94.0 | 96.0 | 95.0 | 96.2 | 96.5 | 96.5 | 99.7 | 100.0 | 101.2 | 102.2 | 100.3 | 97.5 | |
| 200 | 90.9 | 92.7 | 91.9 | 93.7 | 92.9 | 92.2 | 92.2 | 91.7 | 91.7 | 92.7 | 94.7 | 96.2 | 99.4 | 100.9 | 101.7 | 99.3 | 95.9 | |
| 250 | 96.9 | 99.9 | 97.4 | 102.4 | 100.4 | 97.4 | 96.9 | 94.7 | 93.9 | 95.4 | 96.9 | 98.5 | 100.4 | 102.2 | 101.7 | 99.6 | 98.8 | |
| 315 | 102.0 | 96.0 | 103.2 | 103.0 | 99.0 | 101.2 | 97.5 | 99.7 | 98.5 | 97.2 | 99.7 | 100.5 | 103.0 | 102.5 | 102.0 | 98.3 | 100.5 | |
| 400 | 96.1 | 100.6 | 100.4 | 105.4 | 106.9 | 102.4 | 95.6 | 99.1 | 97.9 | 98.1 | 97.1 | 98.4 | 99.6 | 100.4 | 99.9 | 96.3 | 101.2 | |
| 500 | 103.1 | 108.9 | 114.9 | 114.9 | 112.4 | 109.4 | 107.4 | 105.1 | 104.6 | 105.6 | 102.9 | 102.1 | 100.9 | 100.6 | 98.8 | 98.8 | 108.7 | |
| 630 | 99.1 | 103.1 | 109.9 | 107.9 | 109.4 | 108.6 | 105.4 | 101.6 | 100.9 | 99.6 | 101.6 | 100.6 | 99.9 | 100.6 | 100.4 | 96.8 | 104.9 | |
| 800 | 105.9 | 105.1 | 109.9 | 110.1 | 111.9 | 109.6 | 108.6 | 99.9 | 99.9 | 101.6 | 99.4 | 99.4 | 100.9 | 101.9 | 101.1 | 101.0 | 106.4 | |
| 1000 | 103.2 | 102.7 | 105.5 | 110.2 | 112.2 | 106.5 | 102.5 | 99.2 | 98.7 | 99.0 | 99.2 | 101.5 | 100.0 | 100.0 | 99.5 | 96.1 | 104.9 | |
| 1250 | 104.1 | 105.9 | 106.1 | 110.6 | 115.1 | 106.6 | 103.1 | 101.1 | 99.6 | 100.1 | 99.1 | 99.9 | 99.9 | 99.9 | 97.4 | 96.8 | 104.7 | |
| 1600 | 102.5 | 103.0 | 104.5 | 106.0 | 108.3 | 105.5 | 100.3 | 99.3 | 98.3 | 99.1 | 100.1 | 100.1 | 100.3 | 97.8 | 97.6 | 94.2 | 102.7 | |
| 2000 | 106.5 | 106.5 | 108.5 | 111.2 | 109.7 | 109.0 | 103.2 | 102.5 | 107.5 | 104.7 | 108.2 | 106.5 | 106.7 | 101.7 | 102.2 | 99.1 | 107.3 | |
| 2500 | 103.1 | 104.3 | 105.1 | 106.1 | 106.3 | 104.1 | 99.6 | 97.8 | 99.1 | 100.1 | 100.3 | 100.6 | 100.6 | 97.6 | 96.8 | 94.0 | 102.4 | |
| 3150 | 101.1 | 102.8 | 103.6 | 104.3 | 105.1 | 103.1 | 97.8 | 97.3 | 99.1 | 99.6 | 101.3 | 101.1 | 100.6 | 96.3 | 95.1 | 93.0 | 101.7 | |
| 4000 | 101.2 | 102.2 | 103.2 | 103.7 | 104.2 | 102.4 | 98.2 | 98.9 | 100.9 | 103.2 | 104.4 | 105.2 | 104.5 | 98.5 | 97.0 | 95.1 | 103.3 | |
| 5000 | 99.9 | 100.7 | 100.9 | 102.9 | 102.9 | 100.9 | 96.4 | 95.4 | 98.2 | 98.9 | 99.9 | 101.0 | 100.9 | 97.2 | 95.2 | 92.1 | 100.9 | |
| 6300 | 98.2 | 97.9 | 98.6 | 99.9 | 100.8 | 98.4 | 94.2 | 94.1 | 97.3 | 98.3 | 100.9 | 100.4 | 102.6 | 97.3 | 94.8 | 90.6 | 100.4 | |
| 8000 | 96.2 | 96.9 | 98.5 | 99.2 | 100.2 | 97.9 | 93.4 | 92.9 | 96.7 | 99.0 | 100.5 | 101.1 | 100.9 | 95.7 | 93.7 | 90.7 | 100.5 | |
| 10000 | 94.0 | 95.0 | 96.3 | 97.0 | 98.3 | 97.0 | 91.3 | 90.8 | 94.8 | 96.0 | 98.5 | 98.1 | 99.8 | 94.0 | 92.3 | 87.6 | 99.5 | |
| 12500 | 90.9 | 92.0 | 93.0 | 94.9 | 96.1 | 94.4 | 87.4 | 88.0 | 90.9 | 93.9 | 95.7 | 95.7 | 96.4 | 91.4 | 89.4 | 85.5 | 98.1 | |
| 16000 | 88.1 | 88.4 | 90.1 | 92.3 | 93.8 | 91.3 | 82.4 | 83.4 | 88.0 | 89.9 | 91.4 | 91.6 | 92.5 | 88.3 | 86.8 | 81.7 | 96.6 | |
| 20000 | 83.6 | 83.4 | 86.4 | 89.4 | 91.6 | 87.6 | 78.6 | 78.2 | 82.2 | 85.1 | 87.1 | 88.0 | 88.4 | 83.2 | 82.1 | 76.4 | 95.6 | |
| OVERALL | 114.5 | 115.8 | 119.2 | 120.3 | 120.3 | 117.8 | 114.7 | 112.1 | 113.3 | 113.2 | 114.6 | 114.6 | 115.0 | 113.9 | 114.3 | 113.5 | 116.6 | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 101.4 | 110.1 | 116.2 | 120.6 | 121.9 | 121.5 | 118.0 | 117.2 | 120.0 | 119.5 | 120.7 | 119.9 | 118.7 | 114.0 | 111.4 | 105.1 | | |
| 305 METERS | 76.5 | 89.4 | 98.2 | 102.3 | 104.2 | 104.0 | 100.8 | 100.1 | 102.8 | 101.7 | 103.2 | 101.7 | 100.5 | 95.8 | 92.6 | 85.1 | | |

TABLE VII. - NOISE OF FAN C CONFIGURATION 304 (HARD INLET, FORE-STATOR-TREATED FAN FRAME, HARD EXHAUST, NOMINAL

NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3090 rpm; fundamental blade passage frequency, 1339 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| 50 | 76.5 | 79.7 | 81.5 | 80.3 | 83.3 | 78.2 | 84.0 | 79.8 | 79.2 | 79.2 | 76.8 | 77.4 | 78.7 | 79.8 | 81.7 | 83.7 | 80.5 |
| 63 | 73.0 | 74.1 | 73.1 | 73.0 | 75.0 | 74.3 | 74.0 | 73.6 | 74.3 | 74.6 | 75.1 | 76.6 | 79.3 | 80.6 | 81.5 | 82.5 | 76.7 |
| 80 | 74.8 | 74.5 | 73.0 | 71.8 | 73.8 | 75.6 | 74.8 | 74.3 | 75.3 | 76.3 | 77.6 | 78.9 | 81.3 | 83.3 | 84.6 | 85.8 | 78.8 |
| 100 | 83.2 | 81.3 | 81.7 | 76.3 | 80.2 | 79.5 | 77.8 | 78.8 | 82.0 | 80.5 | 81.7 | 82.3 | 83.8 | 86.5 | 87.0 | 87.9 | 82.4 |
| 125 | 80.1 | 80.6 | 80.1 | 78.8 | 80.1 | 79.5 | 80.0 | 80.3 | 81.6 | 81.8 | 82.3 | 83.4 | 84.3 | 85.5 | 86.5 | 86.3 | 82.4 |
| 160 | 81.3 | 80.4 | 80.9 | 83.1 | 83.3 | 80.6 | 82.3 | 83.1 | 82.1 | 83.3 | 83.6 | 83.5 | 83.1 | 85.4 | 85.3 | 84.0 | 83.1 |
| 200 | 82.0 | 89.3 | 82.8 | 79.2 | 79.2 | 79.2 | 77.8 | 77.7 | 78.5 | 79.5 | 79.5 | 79.9 | 82.2 | 83.5 | 83.5 | 82.2 | 81.2 |
| 250 | 84.2 | 83.9 | 82.7 | 81.4 | 81.4 | 80.2 | 78.5 | 78.7 | 80.7 | 80.9 | 82.0 | 83.5 | 84.4 | 85.5 | 84.5 | 82.1 | 82.2 |
| 315 | 84.0 | 82.6 | 83.0 | 81.1 | 82.0 | 79.8 | 79.6 | 79.5 | 80.6 | 80.8 | 81.6 | 82.6 | 83.3 | 84.1 | 83.0 | 80.7 | 81.7 |
| 400 | 85.3 | 85.1 | 85.4 | 83.8 | 83.8 | 79.8 | 79.4 | 80.3 | 81.3 | 82.4 | 83.3 | 84.0 | 85.1 | 84.6 | 83.1 | 80.6 | 83.1 |
| 500 | 86.4 | 86.1 | 86.6 | 86.4 | 84.7 | 80.7 | 80.6 | 81.1 | 81.7 | 83.6 | 84.2 | 85.2 | 85.7 | 85.1 | 83.2 | 80.5 | 84.1 |
| 630 | 87.7 | 87.2 | 87.7 | 87.2 | 85.0 | 82.0 | 81.2 | 81.8 | 83.0 | 84.8 | 86.3 | 86.6 | 88.0 | 86.8 | 83.8 | 81.1 | 85.4 |
| 800 | 89.6 | 89.5 | 88.8 | 88.0 | 87.0 | 84.3 | 84.1 | 84.3 | 85.5 | 86.3 | 87.8 | 88.9 | 90.6 | 88.5 | 84.8 | 82.7 | 87.3 |
| 1000 | 91.2 | 90.6 | 91.7 | 89.4 | 88.6 | 85.6 | 85.4 | 85.7 | 87.2 | 88.4 | 89.7 | 90.3 | 91.4 | 90.2 | 86.6 | 83.4 | 89.0 |
| 1250 | 99.1 | 99.6 | 101.8 | 101.8 | 101.1 | 98.5 | 93.1 | 93.8 | 92.1 | 92.5 | 95.0 | 94.6 | 96.6 | 95.3 | 91.6 | 88.7 | 97.3 |
| 1600 | 93.0 | 93.2 | 94.3 | 93.8 | 92.8 | 90.0 | 86.5 | 87.8 | 88.7 | 90.0 | 91.7 | 92.1 | 93.7 | 91.5 | 87.3 | 84.6 | 91.4 |
| 2000 | 90.7 | 91.4 | 91.5 | 90.5 | 88.7 | 86.0 | 84.7 | 86.9 | 89.0 | 90.5 | 92.2 | 92.6 | 94.2 | 91.2 | 87.7 | 83.8 | 90.6 |
| 2500 | 95.1 | 95.6 | 97.1 | 96.8 | 96.1 | 92.1 | 87.6 | 87.8 | 89.6 | 92.1 | 92.4 | 92.9 | 94.6 | 94.3 | 90.3 | 84.7 | 93.6 |
| 3150 | 91.2 | 92.5 | 93.5 | 92.5 | 90.9 | 87.0 | 83.5 | 85.0 | 87.9 | 90.2 | 91.5 | 92.8 | 94.2 | 91.4 | 88.2 | 82.6 | 91.2 |
| 4000 | 93.5 | 95.0 | 96.5 | 97.0 | 95.0 | 92.0 | 85.4 | 85.9 | 89.2 | 90.9 | 93.9 | 93.8 | 95.0 | 92.5 | 88.7 | 84.1 | 93.7 |
| 5000 | 92.5 | 94.4 | 93.5 | 94.7 | 91.8 | 89.4 | 83.2 | 83.3 | 87.2 | 88.2 | 89.7 | 90.3 | 92.0 | 90.3 | 87.4 | 81.3 | 91.3 |
| 6300 | 92.1 | 92.2 | 92.9 | 92.7 | 90.9 | 88.1 | 80.8 | 80.6 | 84.1 | 85.5 | 88.0 | 88.1 | 89.5 | 87.5 | 84.1 | 78.4 | 89.9 |
| 8000 | 91.0 | 92.4 | 92.5 | 91.8 | 90.5 | 87.6 | 79.5 | 78.8 | 82.3 | 84.5 | 86.7 | 86.3 | 88.3 | 85.3 | 82.5 | 77.5 | 89.7 |
| 10000 | 89.6 | 91.3 | 90.8 | 93.4 | 89.5 | 87.0 | 78.1 | 76.8 | 79.9 | 81.4 | 84.6 | 83.8 | 86.3 | 83.1 | 80.9 | 74.2 | 89.1 |
| 12500 | 88.0 | 89.7 | 88.5 | 88.5 | 87.1 | 84.3 | 74.5 | 74.4 | 77.0 | 78.5 | 81.5 | 80.8 | 83.2 | 79.5 | 78.1 | 72.1 | 88.1 |
| 16000 | 86.6 | 86.8 | 86.1 | 87.1 | 84.1 | 81.4 | 69.7 | 70.1 | 74.6 | 75.3 | 77.8 | 77.4 | 79.9 | 77.5 | 76.1 | 69.0 | 87.5 |
| 20000 | 83.1 | 84.3 | 84.2 | 84.2 | 81.7 | 77.0 | 67.3 | 67.1 | 70.4 | 72.4 | 75.1 | 75.1 | 77.5 | 73.9 | 72.6 | 65.5 | 87.5 |
| OVERALL | 104.7 | 105.5 | 106.5 | 106.3 | 105.2 | 102.3 | 98.0 | 98.5 | 99.5 | 100.8 | 102.6 | 102.9 | 104.4 | 102.9 | 100.1 | 97.5 | 103.6 |
| DISTANCE | | | | | | | | | | | | | | | | | |
| 61 METERS | 90.8 | 99.9 | 105.0 | 107.5 | 108.1 | 106.2 | 102.9 | 103.7 | 105.8 | 107.3 | 108.8 | 108.2 | 108.3 | 105.2 | 99.4 | 91.1 | |
| 113 METERS | 82.0 | 92.2 | 98.0 | 100.5 | 101.6 | 99.6 | 96.6 | 97.5 | 99.5 | 101.1 | 102.2 | 101.6 | 101.5 | 98.6 | 92.4 | 83.7 | |

SIDELINE PERCEIVED NOISE LEVELS

(b) Percent of design speed, 70; fan physical speed, 3605 rpm; fundamental blade passage frequency, 1562 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 79.6 | 75.3 | 78.3 | 78.3 | 77.8 | 78.5 | 79.0 | 80.0 | 80.3 | 81.0 | 81.8 | 83.2 | 84.3 | 86.0 | 88.0 | 89.2 | 82.5 | 129.9 |
| 63 | 86.0 | 79.5 | 83.7 | 88.0 | 81.8 | 83.3 | 83.8 | 84.7 | 81.2 | 84.2 | 85.0 | 85.1 | 87.7 | 87.3 | 89.2 | 90.4 | 85.5 | 132.9 |
| 80 | 78.1 | 77.8 | 76.3 | 75.3 | 75.8 | 77.3 | 76.5 | 77.3 | 79.5 | 81.3 | 82.5 | 85.1 | 87.1 | 89.1 | 91.3 | 92.4 | 84.4 | 131.8 |
| 100 | 79.5 | 78.7 | 79.2 | 77.2 | 78.0 | 79.3 | 79.8 | 81.7 | 83.2 | 84.7 | 86.3 | 87.8 | 90.2 | 91.8 | 93.0 | 93.2 | 86.8 | 134.2 |
| 125 | 84.4 | 84.1 | 86.1 | 83.4 | 83.1 | 84.6 | 84.8 | 85.4 | 86.1 | 87.3 | 87.9 | 89.4 | 90.3 | 91.8 | 92.8 | 92.3 | 88.0 | 135.4 |
| 160 | 83.1 | 84.0 | 84.6 | 83.0 | 84.5 | 84.5 | 85.0 | 86.0 | 86.6 | 86.5 | 86.8 | 88.0 | 89.0 | 90.0 | 89.8 | 88.5 | 86.8 | 134.2 |
| 200 | 85.6 | 85.1 | 84.8 | 82.5 | 84.5 | 83.3 | 82.8 | 84.3 | 83.6 | 83.8 | 84.8 | 86.5 | 88.0 | 89.5 | 89.5 | 87.2 | 85.6 | 133.0 |
| 250 | 89.1 | 88.6 | 88.3 | 85.8 | 86.6 | 85.1 | 83.1 | 83.8 | 86.8 | 87.0 | 87.1 | 88.7 | 90.5 | 91.0 | 90.1 | 87.0 | 87.6 | 135.0 |
| 315 | 87.1 | 87.4 | 86.9 | 85.3 | 85.1 | 84.6 | 84.6 | 84.9 | 86.1 | 86.8 | 87.1 | 88.2 | 89.4 | 89.8 | 88.4 | 85.5 | 86.9 | 134.3 |
| 400 | 89.4 | 91.2 | 90.7 | 90.4 | 86.9 | 86.2 | 86.9 | 86.9 | 87.7 | 89.2 | 88.5 | 89.1 | 91.4 | 85.9 | 88.2 | 87.7 | 88.9 | 136.3 |
| 500 | 91.6 | 91.9 | 93.1 | 89.4 | 88.4 | 86.6 | 85.8 | 87.3 | 87.9 | 87.8 | 88.6 | 89.8 | 91.1 | 90.1 | 87.8 | 85.3 | 89.1 | 136.5 |
| 630 | 91.4 | 93.4 | 93.6 | 92.9 | 91.9 | 88.6 | 87.3 | 85.9 | 88.6 | 89.3 | 91.6 | 91.2 | 93.3 | 91.9 | 88.1 | 86.3 | 90.8 | 138.2 |
| 800 | 92.8 | 93.3 | 92.5 | 92.0 | 92.3 | 90.1 | 88.5 | 88.0 | 89.0 | 90.6 | 92.0 | 92.7 | 94.6 | 92.1 | 88.3 | 86.7 | 91.4 | 138.8 |
| 1000 | 94.6 | 95.5 | 95.7 | 96.7 | 95.0 | 92.5 | 91.6 | 91.8 | 91.5 | 93.1 | 94.1 | 95.1 | 96.8 | 93.8 | 90.5 | 87.9 | 94.1 | 141.5 |
| 1250 | 95.5 | 97.1 | 97.5 | 97.6 | 96.8 | 94.1 | 92.5 | 91.6 | 92.0 | 93.1 | 94.1 | 95.6 | 96.1 | 94.0 | 90.0 | 88.2 | 94.8 | 142.2 |
| 1600 | 100.4 | 109.5 | 109.2 | 112.9 | 111.0 | 107.9 | 104.9 | 104.0 | 100.4 | 99.9 | 100.0 | 103.1 | 102.2 | 100.2 | 98.9 | 96.8 | 106.5 | 153.9 |
| 2000 | 95.7 | 97.0 | 96.7 | 97.0 | 96.5 | 94.4 | 92.0 | 91.9 | 93.5 | 95.0 | 96.2 | 96.8 | 97.9 | 93.5 | 90.9 | 88.4 | 95.5 | 142.9 |
| 2500 | 95.0 | 96.8 | 96.3 | 96.1 | 95.8 | 93.1 | 90.6 | 90.6 | 93.5 | 94.8 | 95.6 | 96.7 | 97.6 | 93.8 | 90.3 | 87.0 | 95.1 | 142.5 |
| 3150 | 101.1 | 104.1 | 104.5 | 103.8 | 104.8 | 100.8 | 95.1 | 93.1 | 96.1 | 96.6 | 98.0 | 100.1 | 101.8 | 100.3 | 96.0 | 91.4 | 101.0 | 148.4 |
| 4000 | 96.6 | 98.4 | 98.4 | 98.6 | 97.6 | 95.9 | 93.8 | 90.3 | 92.9 | 94.8 | 96.6 | 97.1 | 98.6 | 94.2 | 90.1 | 87.2 | 96.6 | 144.0 |
| 5000 | 99.8 | 101.2 | 100.5 | 101.8 | 100.5 | 98.7 | 92.3 | 90.0 | 93.3 | 95.0 | 96.6 | 97.1 | 98.5 | 95.5 | 92.2 | 87.9 | 98.5 | 145.9 |
| 6300 | 96.8 | 97.3 | 97.9 | 98.8 | 97.1 | 95.3 | 88.1 | 86.8 | 90.1 | 90.9 | 93.4 | 93.1 | 95.1 | 91.2 | 88.1 | 83.6 | 95.5 | 142.9 |
| 8000 | 94.5 | 96.8 | 97.0 | 96.6 | 96.3 | 94.3 | 87.0 | 84.8 | 88.5 | 90.0 | 92.3 | 92.7 | 93.5 | 89.2 | 86.3 | 82.5 | 95.0 | 142.4 |
| 10000 | 92.7 | 94.8 | 94.8 | 94.6 | 94.3 | 92.8 | 85.0 | 82.5 | 85.8 | 87.1 | 90.0 | 89.7 | 91.8 | 87.3 | 84.3 | 79.0 | 93.9 | 141.3 |
| 12500 | 90.7 | 92.7 | 91.4 | 91.7 | 91.6 | 89.7 | 80.9 | 79.6 | 82.4 | 84.6 | 86.9 | 87.2 | 88.2 | 83.4 | 81.8 | 76.8 | 92.3 | 139.7 |
| 16000 | 88.7 | 89.7 | 88.7 | 90.2 | 88.2 | 86.0 | 76.2 | 75.2 | 79.7 | 80.3 | 82.5 | 82.9 | 84.5 | 81.6 | 79.7 | 73.5 | 91.2 | 138.6 |
| 20000 | 85.2 | 86.4 | 86.5 | 87.3 | 85.9 | 81.5 | 73.6 | 72.6 | 75.6 | 77.6 | 79.9 | 81.2 | 82.2 | 78.1 | 76.4 | 70.7 | 91.1 | 138.5 |
| OVERALL | 110.2 | 112.5 | 112.4 | 114.5 | 113.2 | 110.3 | 106.8 | 106.0 | 105.3 | 106.1 | 107.2 | 108.6 | 109.5 | 107.3 | 105.2 | 103.4 | 110.1 | 157.5 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 97.4 | 107.7 | 111.6 | 116.1 | 116.6 | 115.1 | 112.6 | 112.3 | 111.9 | 112.6 | 113.4 | 114.1 | 114.3 | 110.5 | 104.7 | 97.9 | | |

TABLE VII. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4128 rpm; fundamental blade passage frequency, 1788 hertz.

| FRT. FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 83.1 | 87.1 | 81.4 | 81.3 | 82.3 | 82.9 | 82.4 | 83.8 | 84.6 | 85.1 | 85.3 | 86.9 | 88.1 | 90.9 | 92.9 | 95.5 | 87.2 | 134.6 |
| 63 | 87.1 | 87.6 | 90.4 | 86.6 | 81.9 | 83.3 | 84.3 | 83.8 | 86.1 | 85.6 | 87.3 | 88.2 | 89.1 | 91.1 | 94.1 | 95.1 | 88.3 | 135.7 |
| 80 | 84.7 | 86.7 | 85.5 | 82.7 | 80.8 | 81.3 | 82.3 | 82.7 | 84.7 | 85.3 | 87.5 | 89.9 | 92.3 | 94.3 | 97.3 | 98.5 | 90.0 | 137.4 |
| 100 | 84.6 | 86.3 | 82.6 | 82.4 | 82.6 | 83.3 | 84.3 | 85.8 | 87.8 | 89.3 | 91.1 | 92.7 | 94.8 | 97.4 | 98.9 | 99.8 | 92.2 | 139.6 |
| 125 | 88.6 | 89.0 | 88.3 | 87.0 | 87.6 | 87.6 | 89.5 | 89.3 | 90.3 | 91.5 | 92.6 | 94.1 | 95.6 | 97.6 | 99.1 | 98.2 | 93.1 | 140.5 |
| 160 | 88.6 | 87.9 | 88.9 | 87.6 | 88.6 | 88.6 | 89.4 | 90.1 | 90.6 | 91.3 | 91.9 | 92.7 | 93.8 | 95.4 | 95.9 | 94.5 | 91.7 | 139.1 |
| 200 | 89.6 | 89.6 | 89.3 | 87.1 | 87.0 | 86.6 | 87.6 | 88.0 | 87.8 | 88.0 | 89.5 | 90.7 | 93.5 | 94.6 | 95.6 | 93.2 | 90.4 | 137.8 |
| 250 | 90.1 | 92.3 | 90.8 | 92.8 | 93.8 | 87.5 | 90.8 | 89.5 | 92.1 | 92.0 | 94.6 | 95.9 | 96.0 | 96.6 | 96.5 | 93.7 | 93.5 | 140.9 |
| 315 | 90.1 | 90.8 | 93.8 | 92.5 | 91.5 | 88.0 | 90.0 | 90.0 | 91.0 | 91.1 | 92.6 | 94.4 | 94.8 | 95.1 | 94.8 | 91.9 | 92.4 | 139.8 |
| 400 | 92.5 | 91.0 | 94.4 | 92.2 | 93.5 | 90.0 | 90.0 | 90.4 | 91.9 | 91.9 | 92.4 | 94.0 | 94.7 | 94.7 | 94.2 | 90.6 | 92.7 | 140.1 |
| 500 | 101.6 | 101.2 | 107.1 | 105.9 | 105.7 | 99.9 | 96.1 | 99.1 | 96.9 | 98.1 | 96.7 | 97.7 | 96.1 | 95.7 | 96.9 | 92.1 | 100.9 | 148.3 |
| 630 | 99.6 | 101.1 | 105.1 | 108.4 | 107.8 | 102.8 | 100.4 | 98.6 | 98.6 | 97.1 | 99.3 | 98.0 | 97.3 | 97.1 | 96.1 | 94.3 | 102.2 | 149.6 |
| 800 | 101.5 | 101.5 | 107.0 | 106.3 | 110.0 | 107.0 | 103.8 | 101.8 | 99.5 | 97.3 | 98.2 | 98.3 | 99.5 | 98.3 | 96.3 | 93.4 | 103.7 | 151.1 |
| 1000 | 102.0 | 102.0 | 105.2 | 107.2 | 109.5 | 106.2 | 103.3 | 99.5 | 98.7 | 98.8 | 99.5 | 99.3 | 101.3 | 98.3 | 96.5 | 95.1 | 103.4 | 150.8 |
| 1250 | 102.1 | 104.7 | 104.4 | 109.1 | 108.7 | 107.1 | 103.7 | 100.7 | 98.2 | 98.2 | 99.1 | 99.8 | 100.4 | 96.7 | 96.7 | 93.3 | 103.8 | 151.2 |
| 1600 | 107.2 | 108.3 | 109.8 | 112.2 | 115.2 | 111.0 | 106.8 | 102.0 | 102.3 | 100.7 | 103.5 | 102.9 | 104.3 | 100.7 | 98.3 | 97.4 | 108.2 | 155.6 |
| 2000 | 109.7 | 110.2 | 111.5 | 113.9 | 116.9 | 112.9 | 108.5 | 103.4 | 104.0 | 101.9 | 105.0 | 104.6 | 106.0 | 102.2 | 100.0 | 99.3 | 110.0 | 157.4 |
| 2500 | 101.9 | 102.9 | 104.4 | 105.1 | 105.7 | 104.1 | 99.6 | 97.1 | 97.9 | 98.6 | 99.7 | 100.0 | 100.4 | 96.6 | 94.2 | 91.8 | 101.7 | 149.1 |
| 3150 | 102.3 | 102.8 | 104.4 | 105.1 | 105.9 | 103.9 | 98.4 | 96.9 | 98.1 | 99.8 | 101.6 | 102.4 | 102.3 | 97.9 | 94.6 | 92.2 | 102.4 | 149.8 |
| 4000 | 104.1 | 103.6 | 104.9 | 105.9 | 106.7 | 105.2 | 98.9 | 96.9 | 98.1 | 99.6 | 101.6 | 102.0 | 103.1 | 99.1 | 95.2 | 92.3 | 103.2 | 150.6 |
| 5000 | 100.9 | 101.8 | 101.9 | 103.6 | 103.1 | 102.3 | 96.8 | 94.3 | 96.6 | 97.6 | 98.8 | 98.9 | 100.1 | 95.6 | 93.8 | 89.7 | 100.7 | 148.1 |
| 6300 | 99.4 | 98.9 | 100.3 | 101.1 | 100.8 | 99.6 | 93.2 | 91.1 | 93.4 | 94.1 | 96.7 | 96.1 | 97.4 | 93.2 | 91.2 | 87.1 | 98.6 | 146.0 |
| 8000 | 97.2 | 98.4 | 99.9 | 99.0 | 100.5 | 98.7 | 92.5 | 89.7 | 92.3 | 93.9 | 96.4 | 96.2 | 96.9 | 92.0 | 89.8 | 86.4 | 98.5 | 145.9 |
| 10000 | 94.9 | 96.1 | 96.6 | 97.1 | 97.9 | 97.3 | 89.7 | 87.1 | 89.7 | 90.7 | 93.7 | 93.1 | 94.9 | 89.6 | 87.6 | 83.0 | 97.1 | 144.5 |
| 12500 | 92.4 | 93.7 | 93.5 | 94.5 | 96.0 | 94.3 | 85.9 | 84.1 | 85.9 | 88.1 | 90.4 | 90.1 | 91.8 | 86.5 | 85.2 | 80.0 | 95.7 | 143.1 |
| 16000 | 90.4 | 90.4 | 91.1 | 93.1 | 92.7 | 91.0 | 81.4 | 79.6 | 83.2 | 84.0 | 86.4 | 86.4 | 88.0 | 83.7 | 83.1 | 77.0 | 94.6 | 142.0 |
| 20000 | 87.1 | 87.3 | 88.7 | 90.3 | 90.9 | 88.1 | 79.4 | 76.3 | 79.2 | 80.9 | 83.6 | 83.9 | 85.1 | 80.6 | 79.8 | 74.0 | 94.7 | 142.1 |
| OVERALL | 15.0 | 115.6 | 117.6 | 119.3 | 121.4 | 117.9 | 113.8 | 110.6 | 110.6 | 110.3 | 112.1 | 112.2 | 113.2 | 110.7 | 109.9 | 108.6 | 115.7 | 163.1 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 102.5 | 111.2 | 116.8 | 121.1 | 124.8 | 122.7 | 119.3 | 116.4 | 117.1 | 116.5 | 118.1 | 117.5 | 117.2 | 112.4 | 108.3 | 102.7 | | |

(d) Percent of design speed, 90; fan physical speed, 4639 rpm; fundamental blade passage frequency, 2010 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 86.8 | 83.1 | 85.3 | 85.1 | 85.9 | 86.4 | 86.9 | 87.3 | 88.1 | 89.1 | 89.9 | 90.5 | 92.6 | 95.6 | 99.1 | 100.8 | 91.9 | |
| 63 | 83.8 | 86.3 | 84.9 | 83.9 | 85.1 | 85.9 | 85.8 | 86.3 | 86.9 | 87.1 | 88.9 | 90.8 | 93.4 | 96.3 | 99.6 | 101.0 | 92.0 | |
| 80 | 91.6 | 90.5 | 89.6 | 89.0 | 90.1 | 88.6 | 85.6 | 89.0 | 88.6 | 89.5 | 92.5 | 93.4 | 97.0 | 100.0 | 102.8 | 104.7 | 95.4 | |
| 100 | 88.1 | 86.1 | 86.5 | 85.8 | 86.5 | 88.3 | 85.3 | 90.5 | 91.5 | 93.5 | 95.8 | 97.0 | 99.8 | 102.6 | 105.8 | 106.3 | 97.8 | |
| 125 | 91.7 | 89.5 | 90.5 | 89.7 | 91.0 | 92.7 | 92.7 | 94.0 | 95.3 | 95.8 | 97.5 | 98.6 | 100.5 | 103.0 | 105.3 | 104.0 | 98.2 | |
| 160 | 94.4 | 92.6 | 93.0 | 92.0 | 94.3 | 93.8 | 96.1 | 96.0 | 96.6 | 97.5 | 97.8 | 98.1 | 99.5 | 101.6 | 102.8 | 100.9 | 97.7 | |
| 200 | 93.7 | 93.5 | 93.3 | 95.7 | 95.5 | 95.0 | 94.5 | 92.5 | 92.5 | 93.0 | 94.2 | 95.9 | 98.7 | 100.8 | 101.8 | 99.1 | 96.3 | |
| 250 | 100.2 | 98.0 | 99.3 | 103.2 | 103.0 | 101.3 | 100.3 | 95.7 | 94.3 | 95.5 | 97.2 | 98.4 | 100.5 | 102.3 | 102.3 | 98.9 | 93.9 | |
| 315 | 99.4 | 99.3 | 104.0 | 105.0 | 98.6 | 95.0 | 99.0 | 99.8 | 101.5 | 100.1 | 99.1 | 100.7 | 102.3 | 101.8 | 101.3 | 97.2 | 100.8 | |
| 400 | 96.6 | 101.1 | 102.4 | 106.1 | 107.4 | 103.2 | 99.7 | 97.6 | 96.6 | 98.6 | 97.7 | 98.8 | 99.6 | 100.7 | 99.6 | 96.3 | 101.6 | |
| 500 | 103.8 | 112.2 | 111.7 | 114.2 | 113.2 | 110.4 | 109.6 | 108.6 | 108.6 | 108.1 | 106.1 | 104.8 | 102.7 | 102.6 | 102.4 | 98.8 | 103.4 | |
| 630 | 98.1 | 107.2 | 107.6 | 108.4 | 108.4 | 106.6 | 104.6 | 102.1 | 101.4 | 100.1 | 99.7 | 100.3 | 99.7 | 100.1 | 99.2 | 97.6 | 104.2 | |
| 800 | 107.4 | 106.8 | 111.3 | 111.2 | 112.2 | 109.0 | 107.5 | 103.5 | 102.3 | 102.3 | 98.3 | 100.6 | 100.3 | 102.5 | 101.7 | 97.0 | 106.8 | |
| 1000 | 103.7 | 104.0 | 108.4 | 111.9 | 112.9 | 108.4 | 104.7 | 100.4 | 99.5 | 100.2 | 99.5 | 100.3 | 99.9 | 100.2 | 98.5 | 95.6 | 106.1 | |
| 1250 | 104.6 | 106.3 | 107.1 | 109.4 | 109.6 | 105.4 | 102.9 | 102.1 | 99.5 | 100.0 | 98.8 | 100.5 | 100.0 | 98.9 | 98.1 | 95.0 | 104.3 | |
| 1600 | 102.7 | 104.2 | 105.7 | 106.4 | 108.0 | 103.9 | 101.0 | 98.2 | 98.5 | 98.7 | 98.9 | 100.1 | 99.2 | 97.9 | 97.4 | 94.4 | 102.5 | |
| 2000 | 106.7 | 108.5 | 108.9 | 112.7 | 110.2 | 108.0 | 105.7 | 103.0 | 106.5 | 104.7 | 105.9 | 106.6 | 106.9 | 102.4 | 101.2 | 99.6 | 107.5 | |
| 2500 | 103.7 | 105.6 | 105.2 | 107.7 | 107.1 | 104.2 | 100.2 | 98.4 | 99.2 | 99.4 | 100.2 | 100.2 | 99.9 | 98.1 | 96.6 | 93.6 | 102.9 | |
| 3150 | 101.8 | 103.5 | 104.4 | 105.0 | 106.0 | 102.7 | 98.7 | 97.9 | 99.0 | 99.9 | 100.9 | 101.5 | 100.0 | 97.4 | 95.5 | 93.1 | 102.1 | |
| 4000 | 101.4 | 103.1 | 104.1 | 105.3 | 105.4 | 102.9 | 98.6 | 98.8 | 100.8 | 101.9 | 103.8 | 104.6 | 104.0 | 99.1 | 97.5 | 94.7 | 103.4 | |
| 5000 | 100.4 | 101.9 | 101.5 | 104.2 | 103.5 | 101.5 | 97.0 | 95.7 | 98.2 | 97.7 | 99.2 | 99.7 | 99.5 | 96.7 | 96.1 | 91.3 | 101.0 | |
| 6300 | 98.2 | 98.8 | 99.7 | 101.8 | 101.7 | 98.9 | 94.6 | 93.6 | 96.5 | 96.7 | 99.2 | 98.9 | 100.2 | 95.6 | 94.6 | 89.0 | 99.9 | |
| 8000 | 96.2 | 98.0 | 99.0 | 100.0 | 101.7 | 98.4 | 93.5 | 91.9 | 95.2 | 96.0 | 98.4 | 98.2 | 98.5 | 93.4 | 92.7 | 88.7 | 99.6 | |
| 10000 | 93.7 | 95.5 | 96.3 | 98.2 | 99.4 | 97.0 | 91.3 | 89.5 | 92.7 | 92.8 | 96.0 | 95.2 | 96.3 | 91.7 | 90.2 | 85.1 | 98.3 | |
| 12500 | 90.7 | 93.2 | 93.3 | 96.0 | 97.5 | 95.0 | 88.1 | 87.7 | 89.5 | 91.0 | 93.2 | 92.6 | 93.6 | 88.5 | 87.8 | 83.2 | 97.3 | |
| 16000 | 88.3 | 90.2 | 90.7 | 94.8 | 95.3 | 92.2 | 84.0 | 83.4 | 87.6 | 87.4 | 89.2 | 89.6 | 90.1 | 86.4 | 86.1 | 80.3 | 96.6 | |
| 20000 | 85.5 | 86.8 | 88.9 | 93.1 | 93.9 | 89.9 | 82.6 | 80.3 | 83.8 | 84.8 | 86.6 | 87.5 | 88.1 | 83.5 | 83.1 | 77.4 | 97.3 | |
| OVERALL | 115.0 | 117.7 | 118.8 | 120.9 | 120.7 | 117.6 | 115.5 | 113.5 | 114.0 | 113.8 | 114.3 | 114.4 | 113.9 | 114.5 | 113.2 | 116.8 | 164.2 | |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 101.8 | 111.7 | 116.6 | 121.7 | 122.5 | 121.1 | 119.3 | 117.8 | 119.8 | 119.1 | 119.6 | 119.4 | 118.3 | 114.2 | 111.1 | 104.9 |
| 305 METERS | 77.5 | 91.6 | 97.3 | 103.4 | 104.7 | 103.6 | 102.3 | 100.8 | 102.7 | 101.9 | 101.9 | 101.6 | 100.3 | 96.1 | 92.4 | 84.9 |

TABLE VIII. - NOISE OF FAN C CONFIGURATION 305 (HARD INLET, FULLY TREATED FAN FRAME, HARD EXHAUST, NOMINAL NOZZLE)

TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15°C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3117 rpm; fundamental blade passage frequency, 1350 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|----------------|-------------------------|--|--|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | | | |
| 50 | 77.7 | 79.2 | 80.8 | 82.8 | 83.2 | 80.5 | 86.8 | 80.8 | 83.0 | 81.3 | 81.7 | 87.1 | 83.7 | 80.7 | 82.5 | 84.2 | 83.3 | 130.7 | | |
| 63 | 72.2 | 74.3 | 73.7 | 75.2 | 76.3 | 78.5 | 81.7 | 78.2 | 79.3 | 78.7 | 81.3 | 85.2 | 84.8 | 81.0 | 81.8 | 83.7 | 80.9 | 128.3 | | |
| 80 | 73.5 | 74.5 | 73.1 | 74.3 | 75.1 | 77.0 | 81.1 | 78.0 | 77.8 | 79.6 | 81.6 | 85.7 | 84.5 | 83.6 | 85.0 | 85.7 | 81.4 | 128.8 | | |
| 100 | 80.1 | 79.8 | 79.0 | 80.8 | 81.0 | 78.3 | 81.5 | 78.5 | 80.3 | 81.1 | 83.0 | 86.6 | 86.0 | 86.1 | 86.1 | 87.4 | 83.1 | 130.5 | | |
| 125 | 79.3 | 80.0 | 79.2 | 79.0 | 78.7 | 79.5 | 80.8 | 80.5 | 80.3 | 81.8 | 83.8 | 87.1 | 86.0 | 85.2 | 86.2 | 86.2 | 83.1 | 130.5 | | |
| 160 | 82.0 | 82.0 | 82.4 | 84.7 | 84.2 | 82.0 | 82.9 | 83.0 | 82.7 | 84.4 | 84.7 | 85.5 | 85.5 | 85.0 | 84.7 | 83.8 | 84.0 | 131.4 | | |
| 200 | 81.9 | 88.6 | 82.4 | 79.9 | 79.4 | 79.7 | 78.6 | 78.6 | 78.1 | 79.1 | 80.7 | 82.8 | 82.9 | 82.7 | 82.9 | 82.6 | 81.4 | 128.8 | | |
| 250 | 83.7 | 83.9 | 82.7 | 80.7 | 81.0 | 78.5 | 78.4 | 79.2 | 79.4 | 80.7 | 82.0 | 83.9 | 84.7 | 84.4 | 83.7 | 81.9 | 81.9 | 129.3 | | |
| 315 | 83.4 | 82.9 | 82.6 | 81.4 | 80.6 | 79.7 | 79.9 | 80.1 | 79.9 | 80.7 | 81.6 | 83.3 | 83.4 | 83.4 | 82.7 | 80.6 | 81.6 | 129.0 | | |
| 400 | 85.0 | 85.0 | 84.5 | 82.8 | 82.1 | 79.8 | 79.3 | 79.6 | 80.8 | 81.8 | 83.0 | 84.0 | 84.8 | 84.0 | 83.0 | 80.3 | 82.6 | 130.0 | | |
| 500 | 86.2 | 86.3 | 85.5 | 85.0 | 83.0 | 80.8 | 80.0 | 80.7 | 80.3 | 82.0 | 83.2 | 84.4 | 84.8 | 84.5 | 82.3 | 80.0 | 83.2 | 130.6 | | |
| 630 | 87.3 | 87.1 | 86.1 | 85.8 | 83.8 | 81.0 | 79.8 | 80.8 | 81.3 | 82.6 | 83.8 | 84.9 | 86.1 | 85.5 | 82.6 | 79.9 | 83.9 | 131.3 | | |
| 800 | 89.3 | 88.6 | 87.6 | 86.8 | 85.3 | 83.0 | 81.8 | 82.3 | 82.1 | 83.3 | 85.0 | 86.2 | 88.0 | 87.0 | 83.5 | 80.9 | 85.3 | 132.7 | | |
| 1000 | 90.8 | 90.4 | 89.5 | 88.3 | 87.3 | 83.8 | 82.9 | 83.1 | 83.4 | 84.4 | 85.6 | 87.2 | 88.3 | 87.4 | 83.9 | 81.5 | 86.5 | 133.9 | | |
| 1250 | 100.0 | 98.7 | 100.3 | 99.5 | 101.0 | 94.7 | 93.0 | 89.7 | 87.7 | 88.7 | 89.8 | 91.3 | 92.5 | 91.7 | 87.7 | 85.2 | 95.3 | 142.7 | | |
| 1600 | 93.7 | 93.4 | 93.9 | 93.0 | 93.2 | 88.0 | 85.7 | 83.7 | 83.2 | 84.5 | 85.9 | 87.6 | 89.5 | 87.4 | 83.5 | 80.8 | 89.2 | 136.6 | | |
| 2000 | 90.4 | 91.1 | 90.2 | 89.2 | 87.2 | 83.7 | 80.4 | 81.2 | 81.9 | 83.6 | 86.1 | 87.2 | 89.4 | 86.2 | 83.1 | 79.5 | 86.6 | 134.0 | | |
| 2500 | 94.5 | 96.2 | 96.0 | 95.0 | 93.5 | 88.8 | 84.5 | 83.7 | 84.3 | 86.2 | 87.5 | 88.8 | 91.2 | 89.9 | 87.2 | 81.8 | 90.9 | 138.3 | | |
| 3150 | 91.1 | 92.6 | 92.4 | 91.3 | 89.4 | 85.3 | 80.9 | 80.9 | 82.6 | 85.4 | 87.6 | 89.5 | 90.8 | 89.3 | 85.1 | 80.0 | 88.7 | 136.1 | | |
| 4000 | 92.4 | 94.4 | 95.2 | 95.2 | 92.7 | 89.0 | 83.7 | 82.5 | 84.7 | 86.7 | 90.4 | 91.3 | 92.0 | 90.2 | 86.0 | 81.6 | 91.3 | 138.7 | | |
| 5000 | 92.1 | 94.2 | 92.2 | 93.5 | 90.7 | 87.0 | 81.0 | 80.2 | 83.4 | 84.0 | 86.4 | 87.5 | 89.9 | 88.5 | 85.2 | 79.7 | 89.5 | 136.9 | | |
| 6300 | 91.4 | 92.1 | 91.8 | 91.4 | 89.8 | 85.7 | 78.8 | 77.7 | 81.2 | 81.7 | 84.8 | 85.2 | 87.2 | 85.7 | 82.1 | 76.8 | 88.2 | 135.6 | | |
| 8000 | 90.1 | 92.2 | 91.9 | 90.8 | 89.6 | 85.5 | 77.9 | 75.9 | 78.9 | 80.9 | 83.3 | 84.1 | 85.9 | 84.1 | 80.6 | 76.5 | 88.3 | 135.7 | | |
| 10000 | 89.3 | 91.1 | 90.3 | 88.9 | 88.4 | 85.1 | 76.3 | 74.6 | 77.4 | 78.9 | 81.8 | 82.2 | 84.8 | 82.3 | 79.6 | 73.8 | 87.9 | 135.3 | | |
| 12500 | 88.0 | 89.8 | 88.5 | 87.6 | 86.4 | 82.9 | 73.7 | 73.1 | 75.3 | 77.6 | 80.1 | 80.9 | 82.6 | 80.0 | 77.8 | 72.5 | 87.6 | 135.0 | | |
| 16000 | 85.9 | 86.5 | 85.7 | 85.6 | 82.4 | 79.1 | 68.6 | 68.6 | 73.2 | 74.4 | 75.9 | 77.1 | 78.5 | 77.9 | 75.9 | 69.2 | 86.4 | 133.8 | | |
| 20000 | 81.6 | 82.3 | 82.1 | 81.3 | 78.8 | 74.0 | 64.8 | 64.3 | 68.0 | 69.3 | 72.5 | 73.6 | 74.6 | 73.0 | 71.1 | 64.1 | 85.0 | 132.4 | | |
| OVERALL | 104.7 | 105.2 | 105.3 | 104.7 | 104.3 | 99.6 | 97.4 | 95.7 | 96.0 | 97.3 | 99.1 | 100.8 | 101.8 | 100.5 | 98.1 | 96.3 | 101.8 | 149.2 | | |
| DISTANCE | | | | | | | | | | | | | | | | | | | | |
| 61 METERS | 90.4 | 100.0 | 103.9 | 106.1 | 106.5 | 103.9 | 101.4 | 100.6 | 102.0 | 103.4 | 105.6 | 106.0 | 105.8 | 102.4 | 96.9 | 88.9 | | | | |
| 113 METERS | 82.2 | 92.3 | 96.9 | 99.1 | 100.1 | 97.2 | 95.2 | 94.4 | 95.5 | 97.0 | 99.0 | 99.4 | 99.0 | 95.5 | 89.9 | 81.5 | | | | |

SIDELINE PERCEIVED NOISE LEVELS

| DISTANCE | 61 METERS | 113 METERS |
|----------|--|--|
| | 90.4 100.0 103.9 106.1 106.5 103.9 101.4 100.6 102.0 103.4 105.6 106.0 105.8 102.4 96.9 88.9 | 82.2 92.3 96.9 99.1 100.1 97.2 95.2 94.4 95.5 97.0 99.0 99.4 99.0 95.5 89.9 81.5 |

(b) Percent of design speed, 70; fan physical speed, 3630 rpm; fundamental blade passage frequency, 1573 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | | |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 | 160 |
| 50 | 78.6 | 76.7 | 79.7 | 80.7 | 79.9 | 81.2 | 79.6 | 81.1 | 82.7 | 80.7 | 84.2 | 85.5 | 86.2 | 86.6 | 87.6 | 88.8 | 83.6 | 131.0 |
| 63 | 83.6 | 79.0 | 85.6 | 87.6 | 81.3 | 86.5 | 85.0 | 86.1 | 84.6 | 86.5 | 88.3 | 86.7 | 90.0 | 88.1 | 89.0 | 90.3 | 86.9 | 134.3 |
| 80 | 76.6 | 76.6 | 77.5 | 78.3 | 78.5 | 78.8 | 76.8 | 78.6 | 79.8 | 81.0 | 84.8 | 87.1 | 89.0 | 89.0 | 91.3 | 92.3 | 85.1 | 132.5 |
| 100 | 79.3 | 78.3 | 79.4 | 80.9 | 80.4 | 80.4 | 80.1 | 81.6 | 83.3 | 84.9 | 86.6 | 88.2 | 89.6 | 91.4 | 93.4 | 93.2 | 86.9 | 134.3 |
| 125 | 86.2 | 85.5 | 87.2 | 87.2 | 86.3 | 85.0 | 86.0 | 85.7 | 86.2 | 88.0 | 89.0 | 89.8 | 91.0 | 91.5 | 93.5 | 92.6 | 88.7 | 136.1 |
| 160 | 83.3 | 83.8 | 85.3 | 84.4 | 84.6 | 84.1 | 84.4 | 84.9 | 85.9 | 86.1 | 86.6 | 88.2 | 88.9 | 89.1 | 89.6 | 89.6 | 86.6 | 134.0 |
| 200 | 85.8 | 84.6 | 86.3 | 85.1 | 85.1 | 83.4 | 83.9 | 85.4 | 82.4 | 82.6 | 85.9 | 87.0 | 88.8 | 89.3 | 89.6 | 88.7 | 86.1 | 133.5 |
| 250 | 89.5 | 87.2 | 88.3 | 84.8 | 85.8 | 84.7 | 82.2 | 83.5 | 84.8 | 86.7 | 87.5 | 89.1 | 89.3 | 90.2 | 89.5 | 87.9 | 87.1 | 134.5 |
| 315 | 87.1 | 87.5 | 86.5 | 85.5 | 84.8 | 83.6 | 83.8 | 85.0 | 84.6 | 85.3 | 87.0 | 87.4 | 88.1 | 89.1 | 88.5 | 86.4 | 86.3 | 133.7 |
| 400 | 90.1 | 88.2 | 90.6 | 91.6 | 86.6 | 85.6 | 83.7 | 86.6 | 85.6 | 87.1 | 87.1 | 89.2 | 90.7 | 88.9 | 88.2 | 87.1 | 88.2 | 135.6 |
| 500 | 92.4 | 90.1 | 89.6 | 90.1 | 87.6 | 84.7 | 85.6 | 85.6 | 85.7 | 86.7 | 87.4 | 89.0 | 89.7 | 89.6 | 87.7 | 85.4 | 87.9 | 135.3 |
| 630 | 90.7 | 93.4 | 94.1 | 91.2 | 92.1 | 87.9 | 86.7 | 85.4 | 99.1 | 88.4 | 88.9 | 90.0 | 90.1 | 91.1 | 88.2 | 85.9 | 89.9 | 137.3 |
| 800 | 92.1 | 91.9 | 91.4 | 90.8 | 90.9 | 89.1 | 86.3 | 86.1 | 86.8 | 88.4 | 89.3 | 90.2 | 91.8 | 90.3 | 87.6 | 85.6 | 89.5 | 136.9 |
| 1000 | 94.3 | 94.7 | 94.1 | 95.6 | 93.7 | 90.5 | 90.5 | 90.3 | 88.5 | 90.3 | 90.0 | 91.9 | 94.0 | 91.5 | 88.5 | 86.7 | 92.0 | 139.4 |
| 1250 | 94.9 | 95.6 | 96.8 | 95.4 | 95.4 | 92.1 | 90.4 | 88.4 | 88.8 | 88.9 | 90.1 | 92.0 | 92.4 | 90.9 | 87.9 | 85.8 | 92.4 | 139.8 |
| 1600 | 106.5 | 106.9 | 110.4 | 110.0 | 108.9 | 105.0 | 102.4 | 99.2 | 98.0 | 96.9 | 96.0 | 100.0 | 98.5 | 97.4 | 95.0 | 94.8 | 104.3 | 151.7 |
| 2000 | 95.1 | 95.7 | 96.4 | 95.9 | 95.4 | 92.2 | 88.9 | 87.2 | 88.4 | 89.4 | 91.1 | 92.2 | 93.4 | 99.7 | 87.2 | 84.8 | 92.5 | 139.9 |
| 2500 | 94.4 | 95.6 | 95.6 | 94.9 | 93.3 | 91.3 | 86.9 | 86.1 | 87.8 | 89.6 | 91.4 | 91.9 | 93.1 | 90.0 | 87.3 | 84.0 | 91.9 | 139.3 |
| 3150 | 101.8 | 102.0 | 103.2 | 102.2 | 101.7 | 98.2 | 93.0 | 91.2 | 91.3 | 92.7 | 94.3 | 96.8 | 97.7 | 98.5 | 93.2 | 88.9 | 98.5 | 145.9 |
| 4000 | 95.8 | 97.0 | 97.7 | 96.8 | 95.8 | 93.2 | 87.7 | 86.7 | 88.5 | 90.4 | 92.7 | 94.0 | 95.7 | 91.5 | 88.5 | 84.8 | 94.1 | 141.5 |
| 5000 | 98.2 | 99.8 | 99.2 | 100.2 | 98.3 | 96.2 | 89.5 | 88.0 | 89.1 | 90.8 | 93.0 | 93.8 | 96.3 | 92.5 | 90.1 | 85.9 | 96.2 | 143.6 |
| 6300 | 95.5 | 95.7 | 97.1 | 97.0 | 95.5 | 93.3 | 86.2 | 83.8 | 86.3 | 87.5 | 90.2 | 90.3 | 92.3 | 88.7 | 86.5 | 81.5 | 93.5 | 140.9 |
| 8000 | 93.6 | 95.3 | 96.4 | 95.4 | 94.4 | 91.9 | 84.8 | 81.8 | 84.9 | 86.4 | 89.1 | 90.0 | 91.3 | 87.3 | 84.4 | 81.1 | 93.1 | 140.5 |
| 10000 | 92.1 | 93.9 | 94.8 | 92.9 | 92.9 | 90.8 | 82.6 | 79.9 | 82.9 | 84.8 | 87.6 | 87.3 | 90.1 | 85.9 | 83.3 | 78.2 | 92.4 | 139.8 |
| 12500 | 90.3 | 91.9 | 91.8 | 90.9 | 90.8 | 87.3 | 79.3 | 78.4 | 80.9 | 82.6 | 85.7 | 85.9 | 88.0 | 83.4 | 81.6 | 76.8 | 91.3 | 138.7 |
| 16000 | 87.8 | 88.3 | 88.5 | 88.5 | 86.1 | 83.5 | 73.9 | 74.0 | 78.5 | 79.3 | 81.4 | 81.7 | 83.4 | 81.5 | 79.7 | 73.4 | 89.8 | 137.2 |
| 20000 | 83.6 | 84.0 | 85.0 | 84.5 | 82.3 | 77.9 | 70.3 | 69.3 | 73.5 | 74.6 | 77.5 | 77.9 | 79.3 | 76.8 | 75.1 | 68.6 | 88.4 | 135.8 |
| OVERALL | 109.9 | 110.5 | 112.6 | 112.2 | 111.1 | 107.8 | 104.6 | 102.5 | 102.4 | 102.9 | 104.0 | 105.8 | 106.7 | 105.4 | 103.7 | 102.6 | 108.0 | 155.4 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 97.3 | 105.7 | 111.9 | 114.1 | 114.7 | 112.8 | 110.4 | 108.8 | 108.9 | 109.2 | 110.2 | 111.2 | 111.1 | 108.6 | 102.6 | 96.3 | | |

TABLE VIII. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4152 rpm; fundamental blade passage frequency, 1799 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|--|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 82.2 | 79.2 | 80.3 | 80.5 | 81.2 | 82.0 | 82.2 | 82.8 | 83.2 | 84.5 | 85.3 | 86.9 | 88.3 | 89.3 | 92.5 | 94.9 | 133.9 | |
| 63 | 84.2 | 83.7 | 89.4 | 83.9 | 81.9 | 82.9 | 81.9 | 83.6 | 84.4 | 85.9 | 86.4 | 87.3 | 89.6 | 91.1 | 92.6 | 95.3 | 135.0 | |
| 80 | 83.2 | 82.4 | 86.0 | 81.7 | 81.2 | 81.4 | 80.9 | 82.0 | 83.5 | 85.7 | 87.2 | 89.5 | 91.9 | 94.0 | 96.4 | 97.9 | 136.8 | |
| 100 | 82.7 | 81.0 | 81.4 | 81.4 | 81.4 | 82.2 | 83.9 | 84.7 | 86.0 | 89.0 | 90.4 | 92.3 | 94.0 | 96.2 | 98.7 | 99.3 | 138.9 | |
| 125 | 87.9 | 87.6 | 87.3 | 87.8 | 88.6 | 88.3 | 87.4 | 88.8 | 89.8 | 91.6 | 92.4 | 93.5 | 94.9 | 96.6 | 98.4 | 97.5 | 139.9 | |
| 160 | 86.9 | 88.6 | 88.4 | 87.9 | 88.9 | 88.6 | 88.4 | 89.4 | 90.3 | 90.6 | 91.8 | 92.0 | 93.1 | 94.4 | 95.4 | 94.5 | 138.6 | |
| 200 | 87.4 | 89.6 | 87.4 | 86.1 | 86.4 | 86.3 | 86.4 | 86.4 | 86.9 | 87.8 | 89.6 | 90.7 | 92.3 | 94.6 | 95.3 | 93.2 | 137.3 | |
| 250 | 89.6 | 92.6 | 88.8 | 89.9 | 89.6 | 87.8 | 89.6 | 87.3 | 89.3 | 91.8 | 93.6 | 94.2 | 94.3 | 95.6 | 95.8 | 93.8 | 139.5 | |
| 315 | 89.6 | 91.6 | 92.9 | 91.1 | 88.9 | 87.9 | 89.9 | 88.9 | 89.4 | 90.7 | 91.9 | 93.2 | 93.7 | 94.4 | 93.9 | 91.6 | 138.9 | |
| 400 | 90.5 | 90.5 | 93.5 | 91.2 | 90.7 | 88.5 | 89.2 | 88.7 | 91.0 | 90.4 | 91.4 | 93.5 | 93.5 | 93.9 | 93.0 | 90.9 | 139.0 | |
| 500 | 97.5 | 98.7 | 98.4 | 101.5 | 99.0 | 94.2 | 93.2 | 94.9 | 93.0 | 94.5 | 94.9 | 99.3 | 94.5 | 94.4 | 94.0 | 91.4 | 144.0 | |
| 630 | 94.7 | 98.4 | 102.4 | 103.9 | 103.2 | 100.7 | 98.9 | 95.7 | 92.9 | 96.2 | 97.9 | 95.4 | 97.4 | 95.0 | 95.8 | 91.4 | 146.4 | |
| 800 | 101.3 | 103.3 | 106.6 | 107.1 | 110.6 | 108.3 | 104.6 | 102.4 | 99.1 | 99.1 | 98.4 | 99.2 | 97.9 | 96.8 | 95.4 | 92.7 | 151.7 | |
| 1000 | 100.9 | 103.1 | 103.4 | 108.3 | 112.4 | 109.1 | 101.3 | 100.4 | 97.4 | 96.8 | 94.9 | 99.9 | 98.8 | 98.4 | 95.1 | 93.5 | 152.1 | |
| 1250 | 99.9 | 102.3 | 103.8 | 108.1 | 111.9 | 109.3 | 103.4 | 101.3 | 97.3 | 95.6 | 95.1 | 99.4 | 97.6 | 98.8 | 94.1 | 92.6 | 152.1 | |
| 1600 | 106.0 | 106.0 | 110.3 | 109.9 | 112.3 | 109.9 | 105.4 | 101.1 | 97.6 | 97.6 | 99.6 | 99.0 | 100.1 | 95.9 | 95.8 | 93.7 | 153.5 | |
| 2000 | 108.8 | 109.3 | 113.8 | 111.6 | 114.1 | 113.3 | 108.1 | 103.6 | 99.8 | 100.0 | 102.1 | 101.7 | 103.1 | 97.8 | 98.8 | 96.4 | 156.2 | |
| 2500 | 101.3 | 102.2 | 103.0 | 104.3 | 105.7 | 102.5 | 98.3 | 95.5 | 94.3 | 94.7 | 95.7 | 96.1 | 96.5 | 94.0 | 91.3 | 89.1 | 147.6 | |
| 3150 | 100.4 | 102.6 | 104.1 | 103.9 | 105.7 | 102.2 | 96.7 | 94.7 | 94.4 | 95.9 | 98.1 | 98.9 | 98.6 | 95.1 | 91.7 | 89.5 | 148.1 | |
| 4000 | 102.1 | 102.9 | 104.9 | 104.4 | 105.9 | 102.9 | 97.4 | 94.5 | 94.2 | 95.7 | 99.0 | 98.8 | 100.2 | 96.1 | 92.6 | 90.0 | 148.8 | |
| 5000 | 100.0 | 101.5 | 101.8 | 103.0 | 102.6 | 101.3 | 95.1 | 91.6 | 93.5 | 93.8 | 95.3 | 96.1 | 98.5 | 93.8 | 91.3 | 87.8 | 146.8 | |
| 6300 | 97.7 | 98.6 | 99.7 | 100.4 | 100.6 | 98.7 | 91.6 | 88.9 | 90.6 | 91.3 | 93.7 | 93.8 | 95.4 | 91.1 | 88.9 | 84.7 | 144.8 | |
| 8000 | 96.3 | 97.8 | 99.3 | 98.8 | 100.0 | 97.7 | 90.7 | 86.8 | 89.5 | 91.0 | 93.0 | 93.9 | 94.7 | 90.0 | 87.3 | 84.4 | 144.6 | |
| 10000 | 94.7 | 96.2 | 96.7 | 96.7 | 98.2 | 96.3 | 88.5 | 85.0 | 87.3 | 88.8 | 91.2 | 91.4 | 93.2 | 88.7 | 85.8 | 81.4 | 143.7 | |
| 12500 | 92.1 | 94.5 | 93.8 | 94.3 | 95.4 | 93.7 | 84.8 | 82.5 | 84.6 | 86.4 | 88.7 | 88.9 | 90.7 | 85.8 | 83.8 | 80.0 | 142.5 | |
| 16000 | 89.4 | 90.5 | 90.8 | 91.8 | 92.1 | 89.9 | 80.2 | 78.2 | 82.1 | 83.1 | 84.6 | 85.5 | 86.8 | 84.0 | 81.8 | 76.1 | 141.1 | |
| 20000 | 85.1 | 86.4 | 87.4 | 88.8 | 90.1 | 85.7 | 76.6 | 73.7 | 77.0 | 78.4 | 81.1 | 81.9 | 82.9 | 79.4 | 77.7 | 71.3 | 140.5 | |
| OVERALL | 113.6 | 114.7 | 117.7 | 117.8 | 120.3 | 118.1 | 113.0 | 110.1 | 107.6 | 108.1 | 109.4 | 110.3 | 110.7 | 109.0 | 108.6 | 107.5 | 162.1 | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 101.3 | 110.3 | 117.5 | 119.3 | 123.0 | 122.6 | 118.5 | 115.7 | 113.7 | 114.1 | 115.3 | 115.0 | 114.6 | 109.8 | 106.8 | 100.7 | | |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

61 METERS 101.3 110.3 117.5 119.3 123.0 122.6 118.5 115.7 113.7 114.1 115.3 115.0 114.6 109.8 106.8 100.7

(d) Percent of design speed, 90; fan physical speed, 4671 rpm; fundamental blade passage frequency, 2024 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 85.6 | 85.6 | 85.6 | 84.9 | 85.3 | 86.9 | 87.4 | 88.1 | 88.3 | 88.9 | 90.4 | 91.8 | 92.8 | 95.9 | 98.4 | 100.5 | 91.9 | 139.3 |
| 63 | 82.6 | 86.6 | 85.1 | 84.7 | 84.9 | 85.2 | 85.9 | 86.4 | 86.9 | 88.1 | 89.2 | 91.0 | 93.4 | 96.2 | 99.1 | 101.3 | 92.0 | 139.4 |
| 80 | 91.1 | 87.7 | 87.9 | 90.9 | 90.2 | 89.7 | 86.4 | 91.1 | 89.1 | 89.9 | 92.7 | 94.8 | 97.6 | 100.6 | 102.9 | 104.8 | 95.8 | 143.2 |
| 100 | 87.0 | 84.9 | 86.7 | 86.5 | 86.4 | 87.0 | 88.0 | 89.9 | 91.2 | 93.9 | 95.4 | 97.3 | 100.0 | 103.0 | 105.0 | 105.4 | 97.5 | 144.9 |
| 125 | 91.6 | 89.6 | 90.2 | 90.2 | 90.6 | 91.2 | 91.9 | 92.9 | 94.6 | 95.9 | 97.2 | 99.0 | 100.4 | 102.7 | 105.2 | 103.8 | 98.0 | 145.4 |
| 160 | 94.1 | 91.9 | 93.7 | 93.7 | 94.2 | 92.9 | 94.6 | 95.9 | 95.4 | 96.6 | 97.6 | 98.5 | 98.9 | 101.1 | 101.7 | 100.9 | 97.2 | 144.6 |
| 200 | 91.1 | 93.6 | 92.1 | 94.8 | 93.5 | 92.8 | 92.3 | 92.0 | 91.6 | 93.0 | 94.1 | 95.9 | 98.8 | 101.0 | 101.3 | 98.9 | 95.8 | 143.2 |
| 250 | 96.1 | 99.1 | 96.8 | 102.1 | 99.9 | 97.6 | 95.9 | 95.1 | 93.3 | 95.2 | 96.6 | 98.5 | 99.9 | 102.2 | 101.6 | 99.1 | 98.5 | 145.9 |
| 315 | 100.1 | 98.8 | 104.8 | 105.3 | 100.5 | 99.3 | 95.3 | 98.6 | 98.0 | 97.3 | 97.8 | 100.9 | 103.8 | 102.0 | 100.8 | 98.2 | 100.7 | 148.1 |
| 400 | 93.1 | 99.4 | 101.2 | 105.4 | 106.1 | 102.2 | 98.7 | 98.9 | 96.4 | 98.6 | 96.4 | 98.0 | 99.1 | 100.6 | 98.7 | 95.8 | 100.8 | 148.2 |
| 500 | 99.5 | 110.9 | 114.9 | 114.5 | 111.9 | 109.4 | 108.7 | 106.4 | 104.2 | 104.9 | 106.7 | 102.6 | 102.9 | 101.5 | 100.5 | 98.9 | 108.8 | 156.2 |
| 630 | 94.1 | 104.7 | 109.1 | 107.1 | 107.4 | 107.1 | 104.7 | 100.6 | 98.4 | 98.9 | 100.9 | 100.1 | 99.7 | 100.6 | 99.2 | 97.1 | 103.8 | 151.2 |
| 800 | 103.6 | 105.4 | 107.6 | 110.8 | 112.8 | 109.3 | 107.1 | 101.8 | 103.4 | 102.3 | 99.3 | 100.2 | 100.4 | 100.1 | 98.8 | 98.0 | 106.4 | 153.8 |
| 1000 | 101.1 | 101.8 | 107.3 | 110.9 | 110.9 | 106.4 | 103.1 | 98.6 | 98.3 | 98.6 | 97.9 | 100.0 | 99.8 | 98.9 | 97.6 | 95.3 | 104.6 | 152.0 |
| 1250 | 104.0 | 104.2 | 106.0 | 109.4 | 109.5 | 105.2 | 102.5 | 101.0 | 98.7 | 97.5 | 98.0 | 98.8 | 99.5 | 99.5 | 96.7 | 94.6 | 103.8 | 151.2 |
| 1600 | 102.2 | 102.8 | 103.5 | 105.8 | 108.2 | 105.7 | 95.8 | 96.7 | 96.5 | 96.3 | 97.3 | 97.9 | 98.0 | 96.5 | 95.5 | 92.4 | 102.0 | 149.4 |
| 2000 | 106.7 | 109.0 | 109.0 | 110.9 | 111.4 | 106.9 | 101.7 | 99.7 | 101.4 | 101.2 | 103.5 | 101.8 | 102.9 | 99.0 | 97.7 | 95.4 | 105.9 | 153.3 |
| 2500 | 103.7 | 104.7 | 104.7 | 106.4 | 106.9 | 103.2 | 98.7 | 96.7 | 96.1 | 96.7 | 97.1 | 97.3 | 97.7 | 96.1 | 94.4 | 91.8 | 101.7 | 149.1 |
| 3150 | 100.3 | 103.1 | 104.0 | 104.5 | 105.0 | 101.6 | 97.1 | 95.3 | 95.1 | 96.8 | 98.3 | 98.4 | 97.7 | 95.1 | 93.1 | 91.4 | 100.6 | 148.0 |
| 4000 | 101.4 | 102.3 | 103.4 | 103.9 | 104.6 | 101.3 | 96.8 | 95.3 | 96.4 | 99.1 | 100.4 | 101.6 | 101.3 | 96.4 | 93.9 | 91.5 | 101.3 | 148.7 |
| 5000 | 99.6 | 101.1 | 100.9 | 103.3 | 102.8 | 100.3 | 94.9 | 92.8 | 94.3 | 95.3 | 96.4 | 96.7 | 97.6 | 94.4 | 93.1 | 89.7 | 99.4 | 146.8 |
| 6300 | 97.9 | 98.1 | 99.5 | 100.8 | 100.5 | 97.9 | 92.4 | 91.1 | 92.8 | 94.3 | 96.5 | 96.2 | 98.2 | 93.0 | 91.6 | 87.1 | 98.2 | 145.6 |
| 8000 | 96.2 | 97.4 | 98.9 | 99.6 | 100.4 | 97.3 | 91.6 | 89.1 | 92.2 | 93.6 | 96.1 | 95.9 | 96.7 | 91.6 | 89.9 | 86.9 | 98.1 | 145.5 |
| 10000 | 93.5 | 95.3 | 96.5 | 97.0 | 98.5 | 96.4 | 89.7 | 87.5 | 89.8 | 91.3 | 94.0 | 93.4 | 94.8 | 90.0 | 88.5 | 84.1 | 97.1 | 144.5 |
| 12500 | 90.9 | 93.1 | 93.7 | 95.1 | 96.6 | 94.1 | 86.7 | 85.4 | 87.1 | 89.3 | 91.6 | 91.6 | 92.6 | 87.6 | 86.5 | 82.1 | 96.3 | 143.7 |
| 16000 | 88.1 | 89.6 | 90.1 | 93.0 | 93.8 | 90.8 | 81.8 | 81.3 | 85.3 | 86.6 | 87.9 | 88.5 | 89.1 | 85.6 | 84.6 | 79.0 | 95.2 | 142.6 |
| 20000 | 83.8 | 85.2 | 86.5 | 89.9 | 92.0 | 87.4 | 78.9 | 76.7 | 80.2 | 81.8 | 84.4 | 85.2 | 85.5 | 81.7 | 80.5 | 74.6 | 94.8 | 142.2 |
| OVERALL | 113.6 | 116.6 | 119.1 | 120.3 | 120.2 | 117.0 | 114.2 | 111.8 | 111.2 | 111.6 | 112.7 | 112.5 | 113.4 | 113.3 | 113.4 | 112.8 | 115.9 | 163.3 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 101.0 | 111.3 | 116.3 | 120.6 | 122.6 | 120.3 | 116.9 | 115.5 | 116.2 | 116.7 | 117.6 | 117.2 | 116.3 | 112.4 | 108.9 | 103.0 | | |
| 305 METERS | 74.9 | 90.4 | 98.1 | 102.3 | 104.8 | 102.8 | 100.4 | 99.0 | 99.2 | 99.4 | 100.2 | 98.9 | 98.2 | 94.4 | 90.4 | 84.0 | | |

TABLE IX. - NOISE OF FAN C CONFIGURATION 306 (HARD INLET, FULLY TREATED FAN FRAME, HARD EXHAUST, NOMINAL NOZZLE, RAKES) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3135 rpm; fundamental blade passage frequency, 1358 hertz.

| FREQUENCY | ANGLE, .DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 78.4 | 80.9 | 78.0 | 83.4 | 80.0 | 77.9 | 85.0 | 77.2 | 80.5 | 79.4 | 77.7 | 78.8 | 78.9 | 79.7 | 81.7 | 83.3 | 80.6 | 128.0 |
| 63 | 71.3 | 74.6 | 73.4 | 74.6 | 74.3 | 74.9 | 76.3 | 73.4 | 74.8 | 74.1 | 75.4 | 77.7 | 78.6 | 79.8 | 81.3 | 82.8 | 76.8 | 124.2 |
| 80 | 73.3 | 74.8 | 73.6 | 73.4 | 72.8 | 74.9 | 74.3 | 73.8 | 74.9 | 75.6 | 77.4 | 80.0 | 81.4 | 82.8 | 94.4 | 85.2 | 78.6 | 126.0 |
| 100 | 81.6 | 77.2 | 76.9 | 79.9 | 81.1 | 80.1 | 76.7 | 77.6 | 78.6 | 78.7 | 81.9 | 82.6 | 84.4 | 84.9 | 86.4 | 87.1 | 81.7 | 129.1 |
| 125 | 78.4 | 79.0 | 79.0 | 78.9 | 79.2 | 79.5 | 78.7 | 79.0 | 80.7 | 80.9 | 82.0 | 83.5 | 84.0 | 84.4 | 86.9 | 85.8 | 81.9 | 129.3 |
| 160 | 82.2 | 81.2 | 81.4 | 85.7 | 85.2 | 84.2 | 81.2 | 81.1 | 83.6 | 82.9 | 82.2 | 84.2 | 83.6 | 83.7 | 84.6 | 83.1 | 83.4 | 130.8 |
| 200 | 80.6 | 90.7 | 81.2 | 81.7 | 78.1 | 81.7 | 80.1 | 80.2 | 78.1 | 78.6 | 79.4 | 79.7 | 81.1 | 82.1 | 83.4 | 81.8 | 81.6 | 129.0 |
| 250 | 83.1 | 83.9 | 81.3 | 79.8 | 79.3 | 79.9 | 78.1 | 78.6 | 79.4 | 80.9 | 81.8 | 82.5 | 83.4 | 83.6 | 83.6 | 81.5 | 81.3 | 128.7 |
| 315 | 82.1 | 81.9 | 81.6 | 80.6 | 80.4 | 79.4 | 80.4 | 79.6 | 80.4 | 80.4 | 81.1 | 81.7 | 82.6 | 82.4 | 82.4 | 80.5 | 81.0 | 128.4 |
| 400 | 84.6 | 84.3 | 84.0 | 82.1 | 82.5 | 80.0 | 80.1 | 79.8 | 80.8 | 81.8 | 82.6 | 83.1 | 84.1 | 83.5 | 82.3 | 80.2 | 82.3 | 129.7 |
| 500 | 85.2 | 84.8 | 84.5 | 84.0 | 83.0 | 82.8 | 81.5 | 81.3 | 81.7 | 82.7 | 83.3 | 83.8 | 83.7 | 83.7 | 82.5 | 80.4 | 83.1 | 130.5 |
| 630 | 85.9 | 86.3 | 85.9 | 85.8 | 83.8 | 81.8 | 81.4 | 81.8 | 82.4 | 83.4 | 84.4 | 84.5 | 85.3 | 84.4 | 82.4 | 80.5 | 83.9 | 131.3 |
| 800 | 88.7 | 87.9 | 87.1 | 86.9 | 85.4 | 83.9 | 83.2 | 83.1 | 83.9 | 84.1 | 85.2 | 85.8 | 87.1 | 85.9 | 83.4 | 80.8 | 85.3 | 132.7 |
| 1000 | 89.9 | 89.7 | 89.1 | 88.1 | 87.1 | 84.7 | 83.9 | 83.1 | 84.4 | 84.8 | 85.6 | 86.4 | 87.6 | 87.1 | 84.1 | 81.3 | 86.3 | 133.7 |
| 1250 | 99.2 | 97.4 | 99.9 | 99.7 | 99.2 | 96.9 | 90.1 | 88.1 | 87.7 | 87.5 | 89.1 | 89.3 | 91.6 | 89.0 | 86.4 | 84.8 | 94.6 | 142.0 |
| 1600 | 93.7 | 92.7 | 94.2 | 93.7 | 92.5 | 90.9 | 85.2 | 83.7 | 83.7 | 84.4 | 85.7 | 86.5 | 88.9 | 86.4 | 83.9 | 81.3 | 89.3 | 136.7 |
| 2000 | 89.8 | 91.0 | 90.0 | 88.8 | 86.6 | 84.0 | 81.5 | 81.3 | 82.5 | 83.3 | 85.5 | 86.2 | 88.5 | 85.6 | 82.8 | 79.5 | 86.2 | 133.6 |
| 2500 | 93.7 | 95.2 | 95.1 | 94.7 | 92.9 | 89.2 | 85.2 | 83.2 | 84.2 | 85.2 | 87.2 | 87.9 | 90.6 | 88.2 | 85.9 | 81.3 | 90.3 | 137.7 |
| 3150 | 90.7 | 92.1 | 92.4 | 91.1 | 89.4 | 85.6 | 81.7 | 81.1 | 82.4 | 84.6 | 87.4 | 88.7 | 90.4 | 88.4 | 85.4 | 80.6 | 88.4 | 135.8 |
| 4000 | 91.8 | 94.0 | 95.5 | 95.3 | 92.5 | 89.3 | 83.6 | 82.3 | 84.8 | 86.0 | 89.1 | 90.1 | 91.5 | 89.3 | 86.8 | 82.2 | 91.0 | 138.4 |
| 5000 | 90.8 | 92.7 | 92.6 | 92.8 | 90.3 | 87.2 | 81.6 | 80.5 | 83.0 | 83.6 | 85.3 | 86.6 | 89.5 | 88.0 | 85.3 | 80.7 | 89.0 | 136.4 |
| 6300 | 90.1 | 91.5 | 92.3 | 91.3 | 88.6 | 86.6 | 79.6 | 78.2 | 81.0 | 81.0 | 85.0 | 85.6 | 86.7 | 85.5 | 82.9 | 77.8 | 88.1 | 135.5 |
| 8000 | 90.0 | 92.0 | 92.2 | 90.4 | 88.7 | 86.4 | 78.9 | 76.6 | 79.6 | 79.4 | 83.9 | 84.4 | 86.3 | 83.8 | 81.4 | 77.8 | 88.3 | 135.7 |
| 10000 | 89.8 | 91.0 | 91.0 | 89.0 | 88.0 | 86.3 | 77.5 | 75.6 | 78.3 | 78.6 | 82.1 | 82.0 | 84.5 | 82.3 | 80.3 | 75.3 | 88.1 | 135.5 |
| 12500 | 87.6 | 89.3 | 88.3 | 86.8 | 85.4 | 84.3 | 76.4 | 74.7 | 76.7 | 77.2 | 80.0 | 80.1 | 83.0 | 80.0 | 78.7 | 74.3 | 87.4 | 134.8 |
| 16000 | 83.9 | 85.0 | 84.8 | 84.6 | 81.3 | 80.3 | 69.5 | 69.1 | 73.7 | 73.2 | 76.7 | 77.2 | 78.3 | 77.4 | 76.3 | 70.4 | 85.7 | 133.1 |
| 20000 | 79.4 | 81.0 | 81.0 | 79.9 | 76.4 | 73.6 | 65.1 | 63.8 | 67.3 | 67.7 | 71.2 | 71.5 | 73.3 | 72.0 | 71.0 | 64.1 | 83.6 | 131.0 |
| OVERALL | 104.1 | 104.5 | 105.1 | 104.7 | 103.3 | 101.0 | 96.4 | 95.1 | 96.1 | 96.6 | 98.5 | 99.2 | 100.9 | 99.4 | 98.0 | 96.1 | 101.3 | 148.7 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 89.7 | 99.2 | 103.6 | 106.0 | 105.9 | 104.6 | 101.2 | 100.3 | 102.1 | 102.8 | 104.7 | 104.7 | 105.0 | 101.5 | 96.7 | 88.9 | | |
| 113 METERS | 81.5 | 91.5 | 96.4 | 99.0 | 99.3 | 98.2 | 94.9 | 94.1 | 95.6 | 96.3 | 98.1 | 98.1 | 98.2 | 94.5 | 89.5 | 81.4 | | |

(b) Percent of design speed, 70; fan physical speed, 3658 rpm; fundamental blade passage frequency, 1585 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 77.7 | 77.9 | 78.4 | 78.7 | 77.7 | 78.9 | 79.4 | 79.4 | 80.7 | 80.9 | 82.4 | 82.5 | 83.4 | 85.5 | 87.0 | 89.1 | 82.2 | 129.6 |
| 63 | 79.5 | 84.3 | 87.3 | 85.0 | 80.2 | 87.5 | 87.2 | 86.5 | 84.3 | 86.3 | 89.5 | 83.9 | 89.8 | 88.5 | 89.3 | 89.9 | 87.1 | 134.5 |
| 80 | 76.9 | 78.0 | 76.5 | 76.2 | 77.0 | 78.0 | 78.7 | 77.5 | 79.2 | 80.7 | 82.4 | 84.1 | 87.2 | 89.0 | 91.2 | 92.2 | 84.3 | 131.7 |
| 100 | 79.5 | 81.2 | 79.5 | 78.8 | 79.3 | 81.7 | 81.5 | 81.5 | 82.7 | 84.3 | 86.0 | 87.4 | 89.3 | 91.5 | 92.5 | 93.5 | 86.6 | 134.0 |
| 125 | 88.7 | 88.9 | 88.4 | 88.4 | 89.4 | 89.4 | 88.4 | 86.1 | 86.4 | 85.2 | 87.9 | 89.7 | 91.6 | 92.2 | 93.6 | 93.1 | 89.4 | 136.8 |
| 160 | 82.0 | 84.4 | 84.7 | 83.4 | 83.7 | 84.7 | 84.7 | 84.4 | 85.7 | 86.2 | 87.5 | 88.0 | 88.5 | 89.0 | 90.0 | 89.8 | 86.6 | 134.0 |
| 200 | 83.9 | 84.0 | 86.5 | 84.7 | 84.4 | 83.4 | 85.5 | 84.4 | 83.7 | 83.4 | 88.5 | 87.0 | 89.0 | 89.4 | 89.7 | 89.3 | 86.5 | 133.9 |
| 250 | 86.2 | 85.7 | 85.9 | 83.9 | 85.6 | 84.9 | 84.1 | 83.6 | 85.4 | 86.4 | 89.2 | 89.5 | 89.6 | 89.9 | 89.7 | 88.0 | 87.2 | 134.6 |
| 315 | 87.1 | 85.4 | 85.6 | 87.2 | 88.6 | 84.7 | 85.9 | 85.9 | 86.6 | 86.4 | 86.9 | 87.3 | 89.1 | 89.1 | 88.9 | 86.3 | 87.1 | 134.5 |
| 400 | 87.6 | 90.6 | 91.3 | 91.0 | 86.6 | 87.3 | 85.6 | 86.8 | 87.0 | 88.6 | 87.1 | 88.9 | 92.3 | 89.0 | 88.3 | 88.0 | 88.8 | 136.2 |
| 500 | 89.7 | 88.8 | 89.5 | 90.2 | 86.2 | 85.8 | 86.3 | 85.8 | 85.8 | 87.0 | 87.2 | 88.4 | 89.7 | 89.8 | 88.8 | 85.7 | 87.9 | 135.3 |
| 630 | 90.7 | 92.8 | 92.7 | 89.8 | 92.3 | 91.3 | 87.7 | 86.5 | 89.7 | 88.2 | 88.7 | 89.9 | 91.3 | 90.8 | 88.0 | 86.0 | 90.1 | 137.5 |
| 800 | 91.8 | 91.3 | 90.9 | 89.4 | 89.6 | 90.3 | 88.1 | 87.8 | 88.1 | 88.8 | 89.9 | 90.4 | 91.8 | 90.3 | 88.4 | 85.6 | 89.7 | 137.1 |
| 1000 | 94.3 | 94.4 | 95.0 | 93.0 | 95.0 | 92.4 | 90.6 | 90.3 | 89.3 | 91.6 | 91.6 | 91.4 | 93.9 | 92.8 | 90.8 | 86.0 | 92.4 | 139.8 |
| 1250 | 93.9 | 95.0 | 96.0 | 96.2 | 94.9 | 91.5 | 90.9 | 88.7 | 89.5 | 88.9 | 90.0 | 90.5 | 92.4 | 91.0 | 88.0 | 85.8 | 92.2 | 139.6 |
| 1600 | 102.7 | 106.2 | 109.9 | 113.2 | 108.4 | 104.7 | 102.1 | 98.9 | 95.1 | 95.2 | 98.4 | 97.2 | 97.9 | 95.2 | 97.1 | 95.5 | 104.9 | 152.3 |
| 2000 | 94.2 | 95.2 | 96.0 | 97.5 | 95.5 | 92.8 | 89.3 | 87.7 | 87.8 | 88.3 | 90.2 | 90.9 | 92.8 | 89.5 | 87.7 | 84.7 | 92.5 | 139.9 |
| 2500 | 94.3 | 94.9 | 95.3 | 96.3 | 93.8 | 91.6 | 87.6 | 86.4 | 87.8 | 88.8 | 90.8 | 91.5 | 93.3 | 89.6 | 87.3 | 84.3 | 92.0 | 139.4 |
| 3150 | 171.4 | 102.6 | 103.2 | 101.7 | 102.1 | 99.6 | 92.6 | 90.2 | 91.6 | 91.6 | 94.9 | 96.7 | 98.4 | 99.6 | 94.7 | 89.5 | 98.8 | 146.2 |
| 4000 | 95.2 | 97.4 | 96.9 | 97.1 | 96.1 | 93.9 | 87.9 | 86.4 | 88.4 | 89.4 | 91.9 | 92.7 | 94.9 | 91.6 | 89.4 | 86.0 | 93.9 | 141.3 |
| 5000 | 97.3 | 99.6 | 99.3 | 100.5 | 98.6 | 96.6 | 90.6 | 87.8 | 90.3 | 90.1 | 92.1 | 92.4 | 95.1 | 92.8 | 90.8 | 86.9 | 96.2 | 143.6 |
| 6300 | 94.0 | 96.0 | 96.5 | 97.1 | 95.0 | 94.0 | 86.8 | 83.8 | 86.6 | 86.8 | 90.2 | 90.4 | 91.6 | 89.1 | 87.1 | 82.6 | 93.4 | 140.8 |
| 8000 | 93.4 | 95.8 | 96.1 | 94.9 | 94.9 | 92.9 | 85.4 | 82.4 | 85.4 | 85.1 | 89.1 | 89.6 | 91.3 | 87.4 | 85.6 | 82.4 | 93.2 | 140.6 |
| 10000 | 92.6 | 94.1 | 93.5 | 93.2 | 92.9 | 91.7 | 83.6 | 81.1 | 83.4 | 84.1 | 87.4 | 87.2 | 89.6 | 86.2 | 84.6 | 79.6 | 92.4 | 139.8 |
| 12500 | 90.0 | 92.1 | 90.9 | 90.4 | 89.7 | 88.7 | 80.5 | 78.9 | 81.1 | 81.8 | 84.8 | 84.7 | 87.2 | 83.6 | 82.6 | 78.1 | 91.1 | 138.5 |
| 16000 | 86.3 | 87.7 | 87.2 | 87.6 | 85.3 | 84.1 | 75.3 | 74.5 | 78.8 | 78.3 | 81.4 | 82.2 | 82.8 | 81.3 | 80.4 | 74.7 | 89.3 | 136.7 |
| 20000 | 81.1 | 83.3 | 83.0 | 82.8 | 80.2 | 77.3 | 70.1 | 69.1 | 72.9 | 72.9 | 76.1 | 76.1 | 78.1 | 76.1 | 75.2 | 68.9 | 86.9 | 134.3 |
| OVERALL | 108.2 | 110.3 | 112.2 | 114.4 | 110.9 | 108.1 | 104.7 | 102.4 | 101.9 | 102.3 | 104.5 | 104.8 | 106.5 | 105.5 | 104.4 | 102.9 | 108.3 | 155.7 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 1 METERS | 95.1 | 105.4 | 111.5 | 115.9 | 114.6 | 113.1 | 110.6 | 108.7 | 108.3 | 108.4 | 110.6 | 110.7 | 111.2 | 109.1 | 103.6 | 96.9 | | |

TABLE IX. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4180 rpm; fundamental blade passage frequency, 1811 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| 50 | 82.8 | 80.3 | 80.7 | 80.8 | 81.2 | 82.5 | 83.7 | 83.7 | 83.7 | 84.5 | 85.3 | 86.8 | 88.3 | 89.8 | 93.3 | 94.7 | 134.2 |
| 63 | 87.1 | 83.7 | 85.4 | 80.2 | 81.6 | 81.9 | 83.2 | 84.2 | 84.7 | 86.9 | 85.1 | 87.7 | 89.2 | 90.7 | 94.4 | 96.3 | 135.3 |
| 80 | 85.9 | 82.9 | 83.7 | 79.5 | 81.2 | 81.4 | 82.4 | 83.5 | 84.7 | 87.2 | 87.4 | 89.6 | 91.9 | 94.4 | 96.9 | 98.8 | 137.3 |
| 100 | 83.5 | 82.2 | 81.0 | 80.8 | 81.3 | 83.2 | 83.8 | 85.0 | 88.0 | 89.0 | 90.5 | 92.1 | 95.0 | 96.8 | 99.7 | 99.1 | 139.4 |
| 125 | 87.2 | 86.7 | 85.9 | 85.4 | 87.9 | 88.2 | 87.9 | 88.0 | 90.4 | 91.7 | 93.2 | 93.8 | 95.4 | 96.7 | 98.7 | 97.9 | 143.1 |
| 160 | 87.4 | 87.5 | 87.9 | 87.5 | 89.2 | 89.2 | 89.2 | 89.5 | 90.2 | 90.9 | 91.7 | 92.4 | 93.5 | 95.2 | 96.4 | 95.2 | 139.0 |
| 200 | 88.3 | 88.8 | 87.1 | 86.3 | 86.4 | 86.8 | 87.6 | 86.9 | 87.6 | 87.8 | 89.3 | 91.0 | 93.4 | 94.8 | 95.8 | 93.8 | 137.7 |
| 250 | 89.9 | 89.2 | 88.9 | 91.0 | 90.5 | 87.0 | 90.5 | 89.5 | 90.2 | 91.2 | 93.7 | 95.3 | 95.2 | 96.0 | 96.4 | 93.9 | 140.0 |
| 315 | 89.7 | 90.7 | 92.4 | 91.7 | 90.2 | 88.0 | 91.0 | 90.2 | 90.4 | 90.9 | 92.7 | 94.3 | 94.2 | 94.9 | 95.4 | 92.6 | 139.6 |
| 400 | 90.0 | 90.3 | 92.8 | 94.5 | 92.0 | 92.0 | 90.7 | 89.3 | 92.5 | 91.7 | 91.5 | 93.8 | 93.3 | 94.7 | 94.5 | 92.2 | 140.0 |
| 500 | 101.0 | 102.0 | 105.8 | 106.0 | 104.2 | 99.3 | 101.5 | 99.7 | 96.3 | 97.5 | 94.7 | 97.6 | 96.2 | 96.8 | 95.7 | 96.5 | 148.1 |
| 630 | 97.8 | 103.3 | 107.5 | 109.8 | 104.3 | 102.2 | 102.1 | 101.6 | 96.5 | 96.0 | 100.3 | 95.9 | 97.8 | 96.0 | 98.0 | 93.2 | 149.9 |
| 800 | 99.9 | 103.7 | 109.0 | 108.2 | 111.7 | 109.4 | 106.0 | 104.4 | 101.5 | 99.5 | 102.0 | 97.8 | 98.0 | 97.7 | 97.7 | 92.4 | 153.0 |
| 1000 | 102.9 | 104.4 | 104.7 | 107.5 | 111.9 | 108.5 | 103.5 | 97.0 | 97.0 | 97.2 | 95.7 | 99.8 | 98.2 | 96.0 | 96.5 | 94.1 | 151.8 |
| 1250 | 101.9 | 102.4 | 105.0 | 108.7 | 113.0 | 111.2 | 105.2 | 100.5 | 96.5 | 97.9 | 95.9 | 100.8 | 97.7 | 96.9 | 95.0 | 93.4 | 153.3 |
| 1600 | 106.4 | 106.2 | 107.1 | 108.1 | 108.2 | 107.7 | 102.6 | 98.6 | 96.7 | 96.2 | 96.2 | 96.6 | 98.4 | 95.4 | 94.4 | 93.6 | 150.9 |
| 2000 | 111.1 | 110.9 | 111.7 | 112.1 | 111.9 | 111.1 | 106.9 | 101.6 | 103.7 | 99.6 | 99.4 | 99.8 | 102.4 | 98.4 | 97.1 | 98.1 | 154.9 |
| 2500 | 101.9 | 102.9 | 104.4 | 106.1 | 106.9 | 104.2 | 99.1 | 95.7 | 94.9 | 93.9 | 94.7 | 95.4 | 96.6 | 93.1 | 93.4 | 90.0 | 148.7 |
| 3150 | 101.2 | 102.1 | 103.4 | 104.2 | 104.1 | 102.9 | 97.4 | 94.2 | 93.9 | 94.8 | 97.4 | 98.0 | 98.4 | 94.8 | 93.6 | 90.5 | 147.7 |
| 4000 | 103.2 | 103.9 | 104.9 | 105.7 | 105.4 | 103.5 | 98.4 | 94.4 | 94.6 | 95.7 | 98.4 | 98.0 | 100.4 | 96.2 | 95.7 | 91.6 | 149.1 |
| 5000 | 99.4 | 100.7 | 100.7 | 103.1 | 102.1 | 100.9 | 95.9 | 91.7 | 93.1 | 93.2 | 94.1 | 94.7 | 96.6 | 93.4 | 92.7 | 88.8 | 146.3 |
| 6300 | 97.1 | 98.2 | 99.3 | 100.5 | 99.5 | 98.5 | 92.9 | 89.2 | 90.5 | 90.7 | 93.8 | 93.8 | 94.3 | 91.2 | 90.5 | 86.1 | 144.5 |
| 8000 | 96.9 | 97.7 | 99.1 | 98.2 | 99.1 | 97.2 | 91.9 | 87.2 | 89.6 | 89.9 | 93.4 | 93.7 | 94.3 | 90.2 | 89.2 | 86.1 | 144.3 |
| 10000 | 94.7 | 95.7 | 96.5 | 96.4 | 96.7 | 95.7 | 89.4 | 85.7 | 87.6 | 88.4 | 91.0 | 90.7 | 92.4 | 88.7 | 87.4 | 83.1 | 143.2 |
| 12500 | 92.3 | 93.6 | 93.9 | 93.7 | 94.1 | 92.8 | 86.1 | 83.6 | 85.0 | 85.6 | 88.3 | 87.9 | 90.3 | 86.2 | 85.2 | 81.5 | 141.9 |
| 16000 | 87.7 | 88.2 | 90.1 | 91.2 | 90.1 | 89.1 | 81.2 | 78.9 | 82.3 | 81.9 | 84.9 | 85.1 | 85.9 | 83.8 | 83.2 | 77.4 | 142.2 |
| 20000 | 93.1 | 84.3 | 85.4 | 86.9 | 86.1 | 84.4 | 77.1 | 73.1 | 76.5 | 76.1 | 79.3 | 80.0 | 81.3 | 78.3 | 77.8 | 71.8 | 138.3 |
| OVERALL | 115.0 | 115.6 | 117.5 | 118.5 | 119.7 | 117.8 | 113.6 | 110.3 | 108.5 | 108.3 | 109.4 | 109.8 | 110.5 | 109.0 | 109.5 | 108.3 | 114.6 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | |
| 61 METERS | 102.9 | 111.3 | 116.6 | 119.9 | 121.8 | 121.7 | 118.5 | 115.0 | 114.4 | 113.9 | 114.7 | 114.3 | 114.3 | 109.9 | 107.1 | 102.0 | |

(d) Percent of design speed, 90; fan physical speed, 4700 rpm; fundamental blade passage frequency, 2036 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 85.9 | 83.9 | 85.6 | 85.4 | 85.3 | 87.1 | 86.8 | 87.3 | 88.4 | 88.1 | 89.9 | 91.3 | 93.1 | 95.8 | 99.4 | 100.5 | 92.0 | 139.4 |
| 63 | 83.0 | 85.5 | 85.5 | 84.3 | 85.3 | 85.8 | 86.0 | 86.0 | 87.0 | 87.5 | 89.6 | 91.4 | 94.3 | 96.5 | 99.6 | 101.3 | 92.3 | 139.7 |
| 80 | 87.8 | 91.8 | 94.1 | 93.3 | 88.9 | 86.9 | 88.4 | 90.8 | 88.3 | 91.6 | 94.8 | 95.8 | 98.8 | 100.8 | 103.4 | 105.3 | 96.5 | 143.9 |
| 100 | 87.0 | 85.7 | 86.7 | 86.3 | 86.0 | 88.0 | 88.2 | 90.3 | 92.8 | 95.0 | 96.3 | 97.7 | 100.7 | 103.7 | 105.3 | 105.7 | 98.0 | 145.4 |
| 125 | 92.3 | 89.8 | 90.4 | 89.9 | 91.4 | 92.1 | 92.3 | 92.9 | 94.9 | 96.1 | 97.3 | 98.9 | 101.3 | 102.8 | 105.3 | 104.0 | 98.2 | 145.6 |
| 160 | 94.3 | 91.9 | 93.8 | 92.8 | 95.6 | 94.8 | 96.3 | 96.8 | 97.8 | 97.1 | 96.8 | 97.9 | 99.4 | 100.6 | 101.6 | 100.3 | 97.5 | 144.9 |
| 200 | 91.3 | 92.3 | 92.8 | 95.3 | 94.6 | 93.8 | 93.6 | 92.4 | 91.9 | 93.1 | 93.9 | 96.2 | 99.3 | 100.9 | 102.6 | 99.5 | 96.3 | 143.7 |
| 250 | 97.0 | 99.3 | 100.5 | 105.0 | 103.5 | 101.8 | 100.2 | 96.7 | 94.2 | 96.0 | 97.2 | 98.4 | 101.3 | 102.7 | 102.7 | 99.4 | 100.5 | 147.9 |
| 315 | 101.2 | 97.8 | 104.5 | 105.0 | 100.3 | 100.0 | 97.5 | 98.3 | 98.8 | 98.0 | 98.5 | 100.4 | 103.0 | 101.7 | 101.5 | 98.7 | 100.7 | 148.1 |
| 400 | 95.4 | 100.5 | 100.9 | 106.2 | 107.5 | 102.7 | 101.9 | 99.7 | 98.9 | 98.2 | 97.4 | 97.8 | 99.9 | 100.4 | 100.0 | 96.1 | 101.8 | 149.2 |
| 500 | 102.6 | 109.6 | 115.1 | 115.9 | 113.9 | 110.6 | 107.2 | 106.6 | 105.1 | 104.9 | 106.1 | 103.8 | 102.1 | 101.7 | 101.4 | 98.8 | 109.5 | 156.9 |
| 630 | 97.6 | 106.4 | 109.1 | 109.6 | 107.4 | 107.8 | 105.1 | 102.3 | 100.8 | 99.3 | 102.1 | 101.2 | 99.8 | 100.6 | 99.3 | 96.5 | 104.7 | 152.1 |
| 800 | 107.5 | 106.1 | 109.0 | 112.0 | 112.6 | 110.6 | 108.8 | 102.6 | 104.0 | 102.3 | 98.0 | 99.9 | 101.6 | 101.0 | 101.3 | 98.2 | 107.2 | 154.6 |
| 1000 | 102.5 | 104.3 | 104.5 | 110.3 | 112.2 | 106.8 | 101.7 | 99.0 | 98.8 | 99.0 | 98.7 | 100.3 | 99.2 | 99.0 | 98.2 | 95.9 | 104.8 | 152.2 |
| 1250 | 104.6 | 103.4 | 105.4 | 110.2 | 110.2 | 105.4 | 103.2 | 101.4 | 100.9 | 98.9 | 98.2 | 99.0 | 99.4 | 98.4 | 97.9 | 95.9 | 104.3 | 151.7 |
| 1600 | 101.8 | 102.5 | 104.3 | 105.1 | 108.0 | 104.5 | 99.6 | 97.0 | 96.5 | 97.1 | 96.8 | 97.4 | 98.1 | 97.3 | 96.5 | 92.7 | 101.7 | 149.1 |
| 2000 | 105.0 | 107.0 | 108.1 | 109.5 | 108.8 | 107.3 | 102.3 | 99.3 | 99.5 | 101.5 | 103.1 | 101.4 | 102.5 | 99.0 | 98.3 | 95.9 | 104.8 | 152.2 |
| 2500 | 102.5 | 104.6 | 106.1 | 105.8 | 106.6 | 102.5 | 98.5 | 95.6 | 96.3 | 96.1 | 96.8 | 96.7 | 97.8 | 95.8 | 95.1 | 92.7 | 101.5 | 148.9 |
| 3150 | 100.6 | 102.6 | 103.1 | 103.6 | 104.6 | 102.1 | 97.4 | 94.4 | 94.9 | 95.4 | 97.1 | 97.5 | 97.1 | 94.7 | 94.2 | 91.3 | 100.1 | 147.5 |
| 4000 | 100.3 | 102.0 | 103.0 | 103.8 | 104.1 | 102.1 | 97.1 | 94.8 | 95.8 | 97.1 | 100.0 | 100.2 | 100.0 | 97.0 | 96.5 | 93.2 | 100.9 | 148.3 |
| 5000 | 98.5 | 100.1 | 100.6 | 103.0 | 102.6 | 100.0 | 95.5 | 92.5 | 94.3 | 94.1 | 95.1 | 95.3 | 96.8 | 94.5 | 94.0 | 89.9 | 99.0 | 146.4 |
| 6300 | 96.3 | 97.7 | 98.8 | 100.1 | 100.0 | 98.3 | 92.9 | 90.4 | 93.3 | 93.5 | 96.7 | 96.3 | 96.9 | 93.0 | 93.2 | 88.5 | 97.9 | 145.3 |
| 8000 | 94.8 | 97.5 | 98.1 | 98.3 | 99.8 | 96.8 | 92.0 | 89.5 | 92.0 | 92.3 | 96.0 | 95.6 | 96.1 | 92.1 | 91.3 | 88.1 | 97.6 | 145.0 |
| 10000 | 93.3 | 95.0 | 96.0 | 96.4 | 98.2 | 96.4 | 90.7 | 88.0 | 90.5 | 91.0 | 93.8 | 92.9 | 94.2 | 90.4 | 89.9 | 85.5 | 96.9 | 144.3 |
| 12500 | 90.5 | 92.7 | 93.0 | 94.6 | 95.9 | 94.1 | 87.5 | 86.3 | 88.3 | 88.2 | 90.9 | 90.8 | 92.8 | 88.1 | 87.4 | 83.7 | 96.0 | 143.4 |
| 16000 | 86.1 | 87.8 | 89.5 | 92.1 | 92.6 | 90.9 | 82.3 | 81.8 | 85.5 | 85.4 | 88.2 | 88.2 | 88.6 | 86.6 | 85.7 | 80.3 | 94.7 | 142.1 |
| 20000 | 81.6 | 83.5 | 85.3 | 88.5 | 89.9 | 86.3 | 78.3 | 76.7 | 80.4 | 80.0 | 83.2 | 83.1 | 84.3 | 81.6 | 81.1 | 74.7 | 93.3 | 140.7 |
| OVERALL | 114.2 | 116.2 | 119.1 | 120.9 | 120.6 | 117.7 | 114.6 | 112.1 | 111.9 | 111.7 | 112.5 | 112.4 | 113.4 | 113.4 | 114.2 | 113.0 | 116.2 | 163.6 |

SIDE LINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 100.6 | 110.4 | 116.0 | 120.1 | 121.7 | 120.7 | 117.5 | 115.5 | 115.9 | 116.5 | 117.3 | 116.5 | 115.9 | 112.4 | 109.8 | 103.5 |
| 305 METERS | 77.0 | 89.9 | 98.3 | 102.7 | 104.1 | 103.3 | 100.7 | 99.1 | 98.9 | 99.4 | 100.0 | 98.6 | 98.1 | 94.5 | 91.2 | 84.3 |

TABLE X. - NOISE OF FAN C CONFIGURATION 308 (SUPPRESSED INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST,
NOMINAL NOZZLE, MUFFLED CASING, RAKES) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3099 rpm; fundamental blade passage frequency, 1342 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | | |
| 50 | 77.2 | 80.5 | 78.8 | 84.0 | 81.0 | 81.3 | 84.7 | 77.7 | 82.2 | 77.8 | 81.7 | 83.4 | 84.7 | 80.5 | 81.8 | 85.0 | 129.5 | | |
| 63 | 70.1 | 72.6 | 70.8 | 74.3 | 75.3 | 73.6 | 73.6 | 72.1 | 73.6 | 72.6 | 75.3 | 78.0 | 81.1 | 79.4 | 80.9 | 82.0 | 124.0 | | |
| 80 | 72.0 | 72.0 | 70.1 | 72.8 | 74.5 | 73.0 | 71.5 | 71.0 | 72.5 | 73.1 | 76.1 | 79.7 | 82.5 | 81.3 | 83.1 | 84.2 | 125.1 | | |
| 100 | 83.1 | 78.8 | 81.3 | 75.8 | 77.4 | 81.3 | 76.9 | 74.9 | 77.4 | 78.3 | 79.4 | 82.9 | 84.4 | 84.1 | 85.3 | 86.3 | 128.5 | | |
| 125 | 76.6 | 75.9 | 76.4 | 75.9 | 76.3 | 76.9 | 77.1 | 76.9 | 78.8 | 79.4 | 80.9 | 82.5 | 83.9 | 83.6 | 84.9 | 84.3 | 127.9 | | |
| 160 | 79.4 | 78.6 | 78.6 | 77.4 | 77.1 | 77.6 | 79.6 | 80.9 | 79.8 | 80.8 | 82.3 | 84.5 | 83.9 | 82.9 | 83.3 | 83.2 | 128.7 | | |
| 200 | 80.8 | 82.1 | 78.8 | 76.9 | 75.4 | 77.8 | 75.4 | 74.9 | 76.1 | 75.9 | 76.8 | 78.7 | 80.6 | 80.9 | 81.8 | 81.0 | 125.7 | | |
| 250 | 79.8 | 80.0 | 78.3 | 76.5 | 76.7 | 76.8 | 76.7 | 77.0 | 78.7 | 80.3 | 81.5 | 83.1 | 84.0 | 83.2 | 82.7 | 81.0 | 127.8 | | |
| 315 | 80.5 | 79.2 | 78.3 | 77.0 | 77.0 | 77.3 | 77.8 | 78.0 | 79.0 | 80.2 | 81.0 | 82.4 | 83.0 | 82.8 | 81.7 | 79.9 | 127.5 | | |
| 400 | 81.9 | 80.8 | 79.4 | 77.6 | 77.3 | 76.3 | 76.8 | 77.6 | 79.1 | 80.9 | 82.4 | 83.7 | 84.4 | 84.3 | 82.8 | 80.8 | 128.5 | | |
| 500 | 82.9 | 80.6 | 79.1 | 77.9 | 77.1 | 76.6 | 77.6 | 78.1 | 79.7 | 80.7 | 82.1 | 83.3 | 84.2 | 84.1 | 82.4 | 80.1 | 128.4 | | |
| 630 | 83.6 | 81.1 | 79.8 | 78.4 | 77.3 | 76.9 | 77.4 | 78.1 | 79.8 | 81.3 | 81.9 | 83.0 | 84.1 | 83.4 | 81.1 | 79.2 | 128.3 | | |
| 800 | 85.4 | 81.9 | 80.3 | 78.8 | 77.8 | 77.8 | 78.3 | 79.1 | 80.3 | 81.1 | 81.9 | 82.7 | 83.9 | 83.6 | 80.8 | 78.8 | 128.5 | | |
| 1000 | 86.2 | 82.7 | 80.7 | 79.0 | 78.5 | 78.2 | 78.7 | 78.8 | 80.2 | 81.0 | 81.3 | 82.1 | 82.8 | 82.3 | 79.8 | 77.9 | 128.2 | | |
| 1250 | 88.4 | 84.9 | 83.0 | 80.9 | 79.7 | 79.9 | 79.0 | 79.4 | 80.0 | 81.4 | 81.9 | 82.3 | 83.7 | 83.9 | 80.4 | 78.6 | 129.3 | | |
| 1600 | 85.3 | 81.8 | 80.5 | 78.6 | 77.5 | 76.8 | 76.3 | 76.6 | 78.1 | 79.0 | 79.8 | 80.4 | 81.3 | 80.8 | 77.8 | 75.7 | 126.8 | | |
| 2000 | 84.2 | 81.2 | 79.1 | 77.2 | 76.2 | 75.6 | 75.1 | 75.2 | 77.6 | 78.1 | 79.2 | 79.5 | 81.6 | 80.4 | 76.6 | 74.1 | 126.1 | | |
| 2500 | 84.6 | 83.4 | 81.4 | 78.4 | 76.8 | 74.6 | 73.8 | 74.1 | 76.8 | 77.4 | 78.8 | 79.2 | 80.4 | 80.3 | 76.8 | 73.7 | 126.2 | | |
| 3150 | 84.4 | 82.9 | 80.3 | 77.1 | 74.9 | 73.3 | 72.6 | 72.6 | 74.8 | 76.3 | 77.8 | 78.9 | 80.6 | 79.4 | 76.1 | 73.5 | 125.6 | | |
| 4000 | 87.9 | 87.4 | 86.6 | 84.8 | 80.9 | 77.4 | 74.9 | 74.2 | 76.6 | 78.6 | 80.4 | 81.8 | 84.7 | 83.2 | 80.9 | 76.3 | 130.0 | | |
| 5000 | 88.1 | 87.9 | 86.6 | 86.4 | 81.9 | 77.8 | 74.1 | 73.4 | 76.1 | 76.4 | 78.9 | 80.9 | 83.1 | 82.4 | 78.9 | 74.7 | 130.1 | | |
| 6300 | 88.6 | 89.5 | 88.8 | 87.1 | 84.0 | 79.3 | 75.3 | 72.6 | 75.6 | 75.6 | 77.6 | 79.9 | 81.6 | 80.1 | 76.9 | 73.6 | 131.2 | | |
| 8000 | 89.8 | 90.3 | 89.2 | 86.8 | 84.7 | 80.4 | 76.2 | 73.3 | 75.7 | 77.5 | 79.8 | 80.2 | 83.2 | 80.8 | 78.3 | 75.5 | 132.6 | | |
| 10000 | 90.6 | 90.6 | 90.2 | 88.8 | 87.2 | 82.8 | 77.1 | 73.8 | 76.4 | 77.3 | 80.1 | 80.3 | 83.1 | 80.3 | 78.0 | 73.9 | 134.6 | | |
| 12500 | 89.0 | 89.5 | 88.3 | 87.3 | 86.5 | 82.3 | 76.1 | 73.3 | 74.8 | 78.3 | 81.2 | 81.1 | 83.7 | 80.7 | 78.8 | 75.3 | 135.1 | | |
| 16000 | 85.4 | 85.5 | 85.2 | 84.6 | 82.6 | 77.4 | 70.6 | 68.6 | 72.4 | 74.7 | 77.5 | 78.9 | 80.2 | 78.6 | 77.1 | 71.5 | 133.6 | | |
| 20000 | 81.3 | 81.3 | 80.6 | 79.5 | 76.5 | 71.3 | 65.5 | 63.4 | 68.0 | 70.1 | 72.0 | 73.7 | 75.0 | 73.4 | 72.2 | 65.6 | 131.3 | | |
| OVERALL | 99.7 | 99.1 | 98.0 | 96.7 | 94.8 | 92.6 | 91.5 | 90.5 | 92.2 | 93.0 | 94.5 | 95.8 | 97.3 | 96.3 | 95.3 | 94.5 | 144.1 | | |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 83.5 | 91.8 | 95.3 | 96.4 | 95.8 | 94.9 | 94.1 | 94.1 | 96.3 | 97.4 | 98.5 | 99.0 | 99.7 | 96.8 | 91.9 | 84.8 | | | |
| 113 METERS | 74.4 | 83.2 | 87.5 | 89.0 | 88.8 | 88.1 | 87.6 | 87.6 | 89.9 | 90.9 | 91.9 | 92.3 | 92.9 | 89.8 | 84.6 | 77.2 | | | |

(b) Percent of design speed, 70; fan physical speed, 3615 rpm; fundamental blade passage frequency, 1566 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|-----------|---|-------|-------|-------|-------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 77.3 | 77.6 | 78.6 | 77.5 | 77.1 | 78.8 | 78.8 | 79.1 | 79.6 | 79.8 | 81.8 | 82.1 | 83.6 | 84.6 | 86.1 | 87.5 | 81.5 | 128.9 |
| 63 | 81.9 | 87.1 | 86.3 | 81.9 | 82.3 | 85.1 | 83.3 | 85.1 | 82.1 | 85.9 | 89.9 | 84.0 | 89.4 | 89.1 | 87.9 | 88.8 | 86.4 | 133.8 |
| 80 | 76.0 | 76.6 | 75.5 | 74.3 | 75.1 | 75.8 | 75.5 | 76.1 | 78.3 | 79.1 | 81.6 | 83.6 | 86.6 | 87.5 | 89.8 | 91.5 | 83.2 | 130.6 |
| 100 | 77.5 | 75.8 | 76.3 | 75.6 | 76.3 | 77.8 | 78.1 | 80.0 | 81.5 | 83.1 | 85.1 | 86.6 | 88.6 | 90.3 | 92.0 | 92.5 | 85.5 | 132.9 |
| 125 | 83.0 | 80.5 | 82.5 | 81.0 | 81.0 | 81.3 | 81.8 | 83.0 | 85.5 | 87.1 | 86.8 | 87.5 | 89.0 | 90.1 | 91.1 | 90.8 | 86.4 | 133.8 |
| 160 | 79.8 | 80.3 | 80.8 | 81.3 | 81.3 | 82.0 | 83.0 | 83.3 | 85.0 | 85.3 | 85.8 | 86.4 | 87.0 | 88.1 | 88.3 | 87.7 | 85.0 | 132.4 |
| 200 | 81.8 | 81.0 | 80.7 | 82.5 | 81.5 | 80.3 | 82.0 | 81.8 | 81.7 | 82.2 | 83.2 | 85.1 | 87.2 | 87.3 | 88.5 | 87.6 | 84.0 | 131.4 |
| 250 | 84.4 | 84.4 | 84.0 | 81.4 | 84.7 | 82.0 | 83.9 | 82.5 | 85.4 | 87.0 | 87.7 | 87.6 | 89.0 | 88.9 | 88.5 | 87.4 | 86.2 | 133.6 |
| 315 | 82.8 | 81.8 | 81.7 | 80.8 | 81.5 | 81.7 | 82.0 | 83.2 | 84.2 | 85.3 | 86.0 | 86.9 | 88.2 | 87.8 | 87.0 | 85.4 | 84.9 | 132.3 |
| 400 | 84.6 | 83.2 | 82.2 | 83.1 | 83.6 | 81.1 | 81.4 | 82.4 | 84.4 | 85.9 | 86.7 | 87.7 | 89.4 | 88.7 | 87.6 | 85.5 | 85.7 | 133.1 |
| 500 | 85.6 | 83.7 | 83.4 | 82.4 | 82.1 | 81.4 | 82.2 | 82.9 | 83.9 | 85.4 | 86.7 | 87.5 | 89.1 | 88.6 | 86.9 | 84.3 | 85.5 | 132.9 |
| 630 | 86.6 | 83.9 | 82.8 | 84.6 | 81.4 | 82.6 | 81.9 | 83.1 | 84.8 | 85.4 | 86.6 | 87.5 | 88.3 | 87.8 | 86.4 | 84.1 | 85.4 | 132.8 |
| 800 | 88.5 | 85.3 | 83.8 | 82.6 | 82.1 | 82.6 | 83.1 | 84.0 | 85.0 | 86.0 | 87.1 | 87.7 | 89.0 | 88.1 | 85.8 | 83.3 | 85.8 | 133.2 |
| 1000 | 90.1 | 86.9 | 84.7 | 82.9 | 82.6 | 82.7 | 83.1 | 84.1 | 85.6 | 86.1 | 86.7 | 87.0 | 88.2 | 87.4 | 85.2 | 83.1 | 85.7 | 133.1 |
| 1250 | 89.8 | 86.8 | 85.2 | 83.7 | 83.0 | 82.7 | 82.8 | 83.8 | 85.3 | 85.8 | 86.0 | 86.7 | 87.8 | 86.5 | 84.3 | 82.2 | 85.5 | 132.9 |
| 1600 | 93.8 | 93.0 | 89.5 | 89.8 | 87.5 | 84.3 | 82.6 | 83.6 | 84.5 | 86.3 | 86.3 | 89.2 | 89.3 | 87.0 | 84.3 | 82.3 | 87.6 | 135.0 |
| 2000 | 88.6 | 86.1 | 83.8 | 82.5 | 81.3 | 80.8 | 80.3 | 81.3 | 83.5 | 83.5 | 84.5 | 85.1 | 87.1 | 84.8 | 82.5 | 79.9 | 84.0 | 131.4 |
| 2500 | 87.6 | 84.9 | 82.8 | 80.9 | 79.4 | 79.4 | 78.6 | 79.9 | 82.4 | 82.8 | 83.4 | 83.9 | 85.1 | 83.6 | 81.3 | 78.3 | 82.8 | 130.2 |
| 3150 | 91.9 | 91.1 | 90.6 | 86.3 | 83.1 | 81.6 | 79.9 | 79.9 | 81.8 | 82.8 | 84.1 | 85.7 | 87.3 | 86.3 | 82.3 | 79.3 | 85.8 | 133.2 |
| 4000 | 90.9 | 89.8 | 88.3 | 85.5 | 82.1 | 80.3 | 78.4 | 78.9 | 81.4 | 82.6 | 84.5 | 85.4 | 87.5 | 84.9 | 82.8 | 79.7 | 85.2 | 132.6 |
| 5000 | 93.3 | 94.2 | 92.3 | 91.0 | 87.0 | 84.0 | 80.0 | 79.6 | 82.6 | 83.3 | 86.1 | 87.4 | 89.3 | 87.3 | 85.5 | 81.2 | 88.5 | 135.9 |
| 6300 | 91.8 | 92.8 | 92.6 | 91.3 | 87.3 | 83.5 | 79.5 | 77.3 | 80.6 | 80.5 | 82.4 | 84.0 | 85.1 | 83.0 | 80.5 | 76.9 | 87.6 | 135.0 |
| 8000 | 92.3 | 93.3 | 92.3 | 90.0 | 87.5 | 84.3 | 79.8 | 77.6 | 80.5 | 82.1 | 84.3 | 84.3 | 86.8 | 83.8 | 81.1 | 78.6 | 88.5 | 135.9 |
| 10000 | 92.7 | 93.4 | 93.1 | 91.3 | 89.7 | 87.0 | 80.7 | 78.3 | 81.1 | 81.3 | 84.0 | 84.0 | 86.5 | 83.4 | 81.0 | 77.3 | 90.2 | 137.6 |
| 12500 | 91.7 | 92.2 | 91.5 | 90.8 | 89.5 | 87.2 | 80.3 | 78.2 | 79.5 | 82.4 | 85.4 | 84.6 | 86.7 | 83.5 | 81.5 | 78.0 | 91.1 | 138.5 |
| 16000 | 87.6 | 88.1 | 88.0 | 87.8 | 85.2 | 82.2 | 75.5 | 74.6 | 78.0 | 80.2 | 82.1 | 83.1 | 83.5 | 82.0 | 80.2 | 75.3 | 89.6 | 137.0 |
| 20000 | 82.6 | 83.4 | 83.0 | 82.3 | 79.2 | 75.8 | 69.7 | 68.5 | 73.3 | 75.3 | 76.9 | 77.9 | 79.3 | 77.3 | 75.6 | 69.8 | 87.1 | 134.5 |
| OVERALL | 103.2 | 103.0 | 101.9 | 100.5 | 98.6 | 96.9 | 95.4 | 95.8 | 97.3 | 98.5 | 99.8 | 100.3 | 101.9 | 101.3 | 100.7 | 100.1 | 101.0 | 148.4 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 41 METERS | 88.3 | 96.2 | 99.7 | 100.9 | 100.3 | 99.8 | 99.1 | 99.8 | 101.8 | 102.6 | 103.6 | 103.7 | 104.1 | 101.2 | 96.5 | 89.9 | | |

SIDE LINE PERCEIVED NOISE LEVELS

DISTANCE

61 METERS 88.3 96.2 99.7 100.9 100.3 99.8 99.1 99.8 101.8 102.6 103.6 103.7 104.1 101.2 96.5 89.9

TABLE X. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4132 rpm; fundamental blade passage frequency, 1790 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|--|--|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | | | |
| 50 | 81.7 | 78.9 | 80.9 | 80.6 | 80.4 | 81.1 | 81.6 | 81.9 | 83.1 | 83.7 | 84.4 | 86.0 | 87.6 | 89.4 | 91.4 | 93.6 | 85.7 | 133.1 | | |
| | 88.7 | 85.5 | 88.9 | 84.7 | 81.5 | 83.0 | 82.2 | 84.5 | 84.5 | 86.7 | 85.0 | 88.1 | 88.7 | 90.2 | 92.7 | 94.8 | 87.5 | 134.9 | | |
| | 85.1 | 82.6 | 84.6 | 80.7 | 79.9 | 81.6 | 80.2 | 82.1 | 83.1 | 85.6 | 86.9 | 88.8 | 91.1 | 93.6 | 95.6 | 97.3 | 88.8 | 136.2 | | |
| 100 | 82.3 | 79.6 | 79.9 | 79.6 | 80.3 | 81.8 | 82.6 | 83.9 | 86.4 | 87.6 | 89.9 | 91.5 | 93.6 | 95.4 | 97.4 | 98.1 | 90.6 | 138.0 | | |
| 125 | 84.9 | 86.9 | 86.3 | 86.8 | 86.4 | 85.9 | 86.6 | 87.4 | 89.3 | 90.4 | 91.6 | 93.0 | 94.1 | 95.8 | 97.6 | 96.5 | 91.6 | 139.0 | | |
| 160 | 84.1 | 85.5 | 86.0 | 86.6 | 87.0 | 87.1 | 88.1 | 88.0 | 89.1 | 90.0 | 90.6 | 91.7 | 92.3 | 94.0 | 94.6 | 94.0 | 90.3 | 137.7 | | |
| 200 | 86.1 | 83.9 | 85.2 | 84.6 | 84.7 | 85.4 | 85.2 | 85.2 | 86.2 | 87.1 | 88.2 | 89.8 | 91.7 | 93.4 | 94.6 | 93.0 | 88.9 | 136.3 | | |
| 250 | 88.1 | 85.4 | 85.9 | 86.4 | 85.9 | 85.1 | 85.6 | 85.9 | 88.3 | 89.8 | 91.8 | 92.9 | 93.8 | 95.4 | 94.8 | 92.7 | 90.6 | 138.0 | | |
| 315 | 86.4 | 86.3 | 87.3 | 87.9 | 88.1 | 88.3 | 87.9 | 87.8 | 88.8 | 89.4 | 90.6 | 91.5 | 92.6 | 93.8 | 93.3 | 91.0 | 90.1 | 137.5 | | |
| 400 | 85.8 | 85.6 | 86.3 | 85.1 | 87.0 | 86.5 | 85.6 | 86.5 | 89.3 | 89.6 | 91.3 | 92.4 | 93.5 | 93.8 | 92.8 | 90.0 | 90.1 | 137.5 | | |
| 500 | 88.7 | 90.3 | 89.8 | 89.5 | 93.0 | 90.0 | 88.2 | 87.7 | 89.7 | 91.7 | 91.5 | 92.1 | 94.3 | 93.5 | 91.8 | 90.0 | 91.3 | 138.7 | | |
| 630 | 88.6 | 87.7 | 89.6 | 89.7 | 88.4 | 89.1 | 87.4 | 87.4 | 89.2 | 90.4 | 91.1 | 91.5 | 93.1 | 92.1 | 91.2 | 89.1 | 90.2 | 137.6 | | |
| 800 | 91.4 | 89.2 | 88.7 | 87.7 | 87.6 | 87.4 | 87.4 | 88.7 | 89.7 | 90.7 | 91.2 | 92.0 | 93.4 | 92.9 | 91.4 | 88.8 | 90.4 | 137.8 | | |
| 1000 | 93.1 | 90.1 | 88.8 | 87.4 | 87.3 | 87.3 | 87.9 | 88.4 | 90.1 | 90.6 | 91.3 | 92.2 | 93.1 | 92.1 | 90.3 | 87.8 | 90.3 | 137.7 | | |
| 1250 | 93.1 | 90.9 | 89.2 | 87.4 | 87.2 | 87.1 | 87.4 | 88.2 | 89.9 | 90.1 | 90.7 | 91.3 | 92.6 | 91.2 | 89.9 | 87.3 | 90.0 | 137.4 | | |
| 1600 | 94.9 | 92.8 | 91.6 | 89.4 | 87.9 | 86.9 | 86.9 | 87.8 | 88.7 | 89.2 | 90.3 | 91.8 | 93.1 | 90.9 | 89.4 | 86.5 | 90.2 | 137.6 | | |
| 2000 | 95.7 | 93.5 | 92.9 | 90.2 | 89.0 | 86.9 | 86.7 | 87.7 | 88.7 | 89.2 | 90.4 | 92.1 | 94.0 | 90.7 | 89.2 | 85.8 | 90.7 | 138.1 | | |
| 2500 | 91.6 | 89.9 | 87.8 | 86.4 | 84.9 | 84.6 | 83.8 | 85.3 | 87.3 | 87.8 | 88.8 | 89.2 | 89.9 | 88.4 | 87.1 | 84.2 | 87.9 | 135.3 | | |
| 3150 | 93.5 | 91.2 | 89.5 | 87.7 | 86.3 | 85.0 | 84.0 | 84.0 | 86.5 | 87.7 | 89.0 | 89.6 | 90.5 | 88.7 | 86.2 | 84.2 | 88.5 | 135.9 | | |
| 4000 | 93.8 | 92.9 | 92.4 | 92.0 | 89.7 | 88.5 | 84.3 | 84.3 | 86.3 | 87.5 | 89.3 | 90.5 | 92.2 | 89.7 | 87.2 | 84.8 | 90.2 | 137.6 | | |
| 5000 | 93.7 | 92.8 | 91.9 | 94.3 | 90.6 | 88.9 | 83.7 | 83.7 | 86.7 | 86.9 | 88.6 | 89.9 | 90.9 | 88.9 | 87.1 | 83.5 | 90.5 | 137.9 | | |
| 6300 | 93.2 | 93.4 | 93.1 | 94.4 | 92.1 | 89.9 | 84.1 | 82.0 | 85.0 | 85.1 | 86.9 | 87.7 | 88.4 | 86.0 | 84.7 | 80.7 | 90.6 | 138.0 | | |
| 8000 | 93.7 | 94.3 | 93.6 | 92.7 | 91.8 | 89.1 | 83.9 | 82.1 | 84.6 | 86.2 | 88.4 | 87.9 | 89.6 | 86.6 | 84.7 | 81.7 | 91.3 | 138.7 | | |
| 10000 | 93.3 | 93.9 | 93.9 | 92.6 | 92.4 | 89.6 | 83.9 | 82.1 | 84.8 | 85.0 | 87.5 | 87.5 | 89.4 | 86.3 | 84.3 | 80.2 | 92.2 | 139.6 | | |
| 12500 | 92.6 | 93.6 | 93.1 | 92.3 | 92.1 | 89.8 | 82.7 | 82.1 | 83.1 | 85.5 | 88.0 | 87.0 | 89.1 | 85.1 | 83.6 | 80.0 | 93.2 | 140.6 | | |
| 16000 | 88.5 | 89.3 | 89.2 | 89.1 | 87.7 | 86.8 | 78.7 | 78.2 | 81.8 | 83.8 | 85.6 | 86.3 | 86.3 | 84.8 | 83.0 | 77.5 | 91.9 | 139.3 | | |
| 20000 | 83.3 | 84.4 | 84.4 | 83.7 | 81.0 | 77.9 | 73.7 | 73.2 | 77.4 | 79.3 | 80.7 | 81.4 | 82.4 | 79.9 | 78.6 | 72.9 | 89.5 | 136.9 | | |
| OVERALL | 105.5 | 104.6 | 104.2 | 103.6 | 102.8 | 101.4 | 99.7 | 100.0 | 101.7 | 102.7 | 103.8 | 104.8 | 106.2 | 106.1 | 106.2 | 105.6 | 104.7 | 152.1 | | |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | | |
| 61 METERS | 91.5 | 98.2 | 102.3 | 104.7 | 105.0 | 105.2 | 103.5 | 104.4 | 106.4 | 107.2 | 108.0 | 108.2 | 108.4 | 105.2 | 101.4 | 95.2 | | | | |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

61 METERS 91.5 98.2 102.3 104.7 105.0 105.2 103.5 104.4 106.4 107.2 108.0 108.2 108.4 105.2 101.4 95.2

(d) Percent of design speed, 90; fan physical speed, 4657 rpm; fundamental blade passage frequency, 2018 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|----------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 85.1 | 81.6 | 83.9 | 83.7 | 84.1 | 85.2 | 86.2 | 85.9 | 86.6 | 87.6 | 88.9 | 90.0 | 92.2 | 94.4 | 96.7 | 99.4 | 90.5 | 137.9 |
| 63 | 82.5 | 85.4 | 84.4 | 83.7 | 84.2 | 84.9 | 85.5 | 85.9 | 86.5 | 86.5 | 88.4 | 90.3 | 93.2 | 95.4 | 98.2 | 100.1 | 91.1 | 138.5 |
| 80 | 90.7 | 94.2 | 95.8 | 93.8 | 89.5 | 86.0 | 86.2 | 91.3 | 88.7 | 89.7 | 92.9 | 93.1 | 96.5 | 98.9 | 101.2 | 103.7 | 95.0 | 142.4 |
| 100 | 86.2 | 84.2 | 84.2 | 84.6 | 84.6 | 85.9 | 86.7 | 88.4 | 90.9 | 92.9 | 94.6 | 96.7 | 99.1 | 101.2 | 103.6 | 104.1 | 96.2 | 143.6 |
| 125 | 87.9 | 86.2 | 86.5 | 87.4 | 88.7 | 89.2 | 91.0 | 91.7 | 93.4 | 94.7 | 96.2 | 97.6 | 99.4 | 101.2 | 103.4 | 102.1 | 96.5 | 143.9 |
| 160 | 87.7 | 90.2 | 90.2 | 91.0 | 91.5 | 91.4 | 92.5 | 93.0 | 94.2 | 94.7 | 95.7 | 96.5 | 97.5 | 99.2 | 100.7 | 99.2 | 95.4 | 142.8 |
| 200 | 87.7 | 88.0 | 89.0 | 91.2 | 91.7 | 91.4 | 91.0 | 90.7 | 92.9 | 91.7 | 93.2 | 94.8 | 97.5 | 99.4 | 100.2 | 98.4 | 94.4 | 141.8 |
| 250 | 92.9 | 90.4 | 92.1 | 97.4 | 97.4 | 96.4 | 95.6 | 94.1 | 93.4 | 94.8 | 95.8 | 97.5 | 98.9 | 100.8 | 100.3 | 98.5 | 96.8 | 144.2 |
| 315 | 87.5 | 92.1 | 99.6 | 99.5 | 95.0 | 92.1 | 93.1 | 93.1 | 93.8 | 94.8 | 95.8 | 97.5 | 98.6 | 99.3 | 99.1 | 96.5 | 96.4 | 143.8 |
| 400 | 88.2 | 90.0 | 91.2 | 95.2 | 96.9 | 94.2 | 92.5 | 91.9 | 93.0 | 94.0 | 95.5 | 96.8 | 98.0 | 99.2 | 98.2 | 95.4 | 95.5 | 142.9 |
| 500 | 93.3 | 95.3 | 98.7 | 103.8 | 102.5 | 98.7 | 96.0 | 94.5 | 93.8 | 95.5 | 95.5 | 97.4 | 98.3 | 98.0 | 97.3 | 94.4 | 98.3 | 145.7 |
| 630 | 90.5 | 91.5 | 95.5 | 94.0 | 96.3 | 93.0 | 92.7 | 93.0 | 93.2 | 94.2 | 95.5 | 96.9 | 97.5 | 97.8 | 96.7 | 94.1 | 95.2 | 142.6 |
| 800 | 94.3 | 92.7 | 93.5 | 93.7 | 93.3 | 92.2 | 92.8 | 92.3 | 93.7 | 95.0 | 95.7 | 96.6 | 97.7 | 98.0 | 96.5 | 93.7 | 95.0 | 142.4 |
| 1000 | 95.4 | 92.9 | 92.9 | 95.1 | 93.6 | 92.6 | 92.4 | 92.6 | 93.9 | 94.4 | 95.6 | 96.8 | 97.4 | 97.4 | 95.4 | 93.0 | 94.9 | 142.3 |
| 1250 | 95.5 | 93.4 | 91.9 | 93.5 | 92.4 | 93.2 | 92.0 | 92.5 | 93.9 | 94.5 | 95.2 | 96.5 | 97.0 | 96.5 | 94.7 | 92.3 | 94.6 | 142.0 |
| 1600 | 96.2 | 93.4 | 92.0 | 92.2 | 91.9 | 90.9 | 90.7 | 91.4 | 93.0 | 93.0 | 94.2 | 95.5 | 96.2 | 95.5 | 93.7 | 90.9 | 93.6 | 141.0 |
| 2000 | 97.1 | 95.9 | 93.6 | 93.7 | 91.7 | 91.7 | 90.9 | 91.4 | 93.4 | 93.7 | 95.1 | 96.3 | 98.2 | 95.6 | 94.2 | 91.0 | 94.6 | 142.0 |
| 2500 | 95.7 | 93.9 | 92.6 | 92.6 | 90.5 | 90.4 | 89.3 | 89.9 | 91.7 | 92.2 | 93.2 | 93.7 | 94.2 | 93.7 | 92.4 | 89.5 | 92.7 | 140.1 |
| 3150 | 94.7 | 94.0 | 93.0 | 93.0 | 91.4 | 90.2 | 89.4 | 89.5 | 91.0 | 92.0 | 93.0 | 93.3 | 93.7 | 92.8 | 91.3 | 88.8 | 92.6 | 140.0 |
| 4000 | 95.7 | 95.9 | 95.7 | 97.2 | 94.0 | 93.2 | 90.2 | 89.7 | 91.4 | 92.5 | 94.7 | 95.0 | 96.0 | 93.2 | 92.0 | 89.1 | 94.6 | 142.0 |
| 5000 | 94.7 | 95.8 | 95.7 | 98.2 | 94.8 | 93.2 | 89.3 | 88.8 | 91.2 | 90.8 | 92.3 | 93.4 | 93.8 | 92.7 | 91.3 | 87.4 | 94.3 | 141.7 |
| 6300 | 94.0 | 95.7 | 95.2 | 97.3 | 95.0 | 93.0 | 88.5 | 86.5 | 89.5 | 89.2 | 90.7 | 91.3 | 91.5 | 90.0 | 89.2 | 84.8 | 93.7 | 141.1 |
| 8000 | 94.4 | 96.4 | 95.4 | 94.8 | 93.3 | 92.0 | 88.0 | 86.4 | 88.7 | 90.4 | 92.1 | 90.9 | 92.4 | 89.7 | 88.6 | 85.2 | 93.9 | 141.3 |
| 10000 | 93.8 | 95.1 | 94.3 | 93.5 | 92.3 | 91.3 | 87.0 | 85.7 | 88.6 | 88.6 | 90.8 | 90.3 | 92.0 | 89.1 | 87.3 | 83.3 | 93.9 | 141.3 |
| 12500 | 92.2 | 94.1 | 92.9 | 92.6 | 91.6 | 90.4 | 85.5 | 85.1 | 86.4 | 88.8 | 90.9 | 89.8 | 91.1 | 87.4 | 86.1 | 82.7 | 94.4 | 141.8 |
| 16000 | 89.0 | 90.8 | 90.3 | 90.7 | 89.1 | 87.1 | 82.0 | 82.0 | 85.4 | 86.7 | 88.0 | 89.0 | 88.5 | 86.6 | 85.6 | 80.5 | 94.0 | 141.4 |
| 20000 | 83.6 | 85.1 | 84.6 | 84.5 | 81.8 | 79.6 | 77.1 | 77.1 | 81.4 | 83.1 | 84.3 | 84.4 | 85.1 | 82.9 | 81.8 | 75.7 | 91.8 | 139.2 |
| OVERALL | 107.2 | 107.3 | 108.0 | 109.6 | 108.3 | 106.5 | 105.2 | 105.0 | 106.0 | 106.9 | 108.2 | 109.3 | 110.6 | 111.3 | 111.8 | 111.2 | 109.1 | 156.5 |
| SIDE LINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 93.4 | 101.4 | 106.0 | 110.1 | 110.0 | 110.1 | 109.0 | 109.3 | 110.9 | 111.6 | 112.7 | 112.6 | 112.5 | 109.9 | 106.6 | 100.3 | | |
| 305 METERS | 68.0 | 79.2 | 85.4 | 91.3 | 92.2 | 91.5 | 91.1 | 91.8 | 93.5 | 93.9 | 94.7 | 94.8 | 94.7 | 91.9 | 88.4 | 82.0 | | |

TABLE XI. - NOISE OF FAN C CONFIGURATION 309 (SUPPRESSED INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST,
NOMINAL NOZZLE, RAKES) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3099 rpm; fundamental blade passage frequency, 1342 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 74.3 | 80.1 | 78.5 | 81.5 | 80.0 | 79.0 | 83.5 | 75.1 | 80.6 | 75.1 | 80.5 | 81.2 | 81.6 | 80.3 | 81.8 | 84.0 | 80.5 | 127.9 |
| 63 | 70.3 | 72.3 | 70.4 | 71.9 | 71.4 | 71.8 | 73.4 | 70.4 | 72.6 | 72.1 | 74.8 | 77.8 | 79.1 | 79.4 | 80.3 | 82.0 | 75.7 | 123.1 |
| 80 | 72.3 | 71.4 | 70.1 | 69.8 | 69.8 | 71.3 | 70.9 | 70.3 | 72.1 | 73.8 | 76.4 | 79.2 | 81.6 | 81.9 | 83.1 | 83.6 | 77.3 | 124.7 |
| 100 | 81.5 | 78.0 | 79.8 | 73.8 | 79.0 | 80.7 | 78.0 | 76.8 | 77.0 | 78.2 | 79.7 | 83.1 | 84.0 | 84.3 | 85.3 | 85.7 | 81.0 | 128.4 |
| 125 | 77.2 | 77.2 | 76.8 | 76.2 | 75.8 | 76.3 | 76.7 | 77.7 | 78.7 | 80.2 | 80.8 | 82.6 | 83.7 | 84.3 | 84.7 | 84.9 | 80.6 | 128.0 |
| 160 | 81.3 | 82.8 | 81.4 | 78.4 | 76.8 | 77.1 | 79.6 | 81.3 | 79.9 | 80.6 | 81.1 | 84.5 | 83.3 | 83.3 | 83.4 | 82.8 | 81.4 | 128.8 |
| 200 | 82.3 | 82.6 | 79.1 | 77.3 | 75.5 | 78.1 | 75.3 | 75.3 | 76.0 | 76.5 | 77.3 | 79.0 | 81.3 | 81.5 | 81.1 | 80.7 | 78.6 | 126.0 |
| 250 | 80.1 | 80.5 | 78.3 | 77.3 | 76.1 | 76.6 | 77.3 | 78.0 | 79.8 | 80.5 | 82.0 | 82.7 | 83.6 | 83.5 | 82.3 | 80.7 | 80.5 | 127.9 |
| 315 | 80.0 | 80.2 | 78.7 | 78.4 | 77.9 | 78.5 | 78.7 | 78.7 | 80.2 | 80.7 | 81.5 | 81.9 | 82.7 | 82.7 | 81.4 | 79.6 | 80.4 | 127.8 |
| 400 | 81.9 | 81.1 | 80.3 | 79.1 | 77.6 | 78.1 | 77.9 | 78.4 | 80.4 | 80.8 | 82.9 | 83.0 | 84.3 | 84.1 | 82.3 | 80.7 | 81.3 | 128.7 |
| 500 | 82.8 | 81.5 | 79.8 | 79.0 | 79.3 | 78.5 | 79.5 | 80.3 | 81.0 | 82.0 | 82.3 | 83.4 | 84.0 | 84.0 | 82.1 | 80.7 | 81.6 | 129.0 |
| 630 | 83.6 | 81.3 | 80.1 | 78.9 | 78.6 | 79.1 | 79.8 | 80.1 | 80.8 | 82.1 | 82.4 | 83.4 | 84.4 | 83.3 | 81.6 | 79.3 | 81.6 | 129.0 |
| 800 | 85.6 | 83.0 | 81.0 | 79.6 | 79.8 | 80.3 | 81.3 | 81.1 | 81.5 | 82.0 | 82.3 | 82.6 | 84.3 | 84.0 | 81.3 | 78.7 | 82.0 | 129.4 |
| 1000 | 86.3 | 83.1 | 81.2 | 79.9 | 79.4 | 79.9 | 81.3 | 81.1 | 81.3 | 81.8 | 81.3 | 82.0 | 83.4 | 82.6 | 79.9 | 78.2 | 81.6 | 129.0 |
| 1250 | 89.6 | 85.4 | 85.1 | 82.6 | 83.2 | 83.1 | 81.7 | 81.7 | 81.4 | 83.1 | 83.6 | 83.2 | 83.9 | 84.1 | 81.2 | 79.6 | 83.4 | 130.8 |
| 1600 | 85.8 | 82.4 | 81.1 | 79.1 | 79.3 | 78.6 | 78.3 | 78.3 | 78.9 | 79.6 | 80.4 | 80.7 | 81.6 | 80.6 | 77.8 | 75.5 | 80.1 | 127.5 |
| 2000 | 84.6 | 81.4 | 79.3 | 78.3 | 77.4 | 76.9 | 76.3 | 76.6 | 78.3 | 78.3 | 79.3 | 79.5 | 81.3 | 80.4 | 77.1 | 74.5 | 79.1 | 126.5 |
| 2500 | 84.5 | 83.3 | 81.2 | 78.3 | 77.0 | 76.8 | 75.2 | 75.3 | 77.3 | 77.8 | 79.0 | 79.4 | 80.7 | 80.3 | 77.0 | 74.2 | 79.1 | 126.5 |
| 3150 | 83.9 | 82.4 | 80.7 | 77.1 | 75.7 | 74.9 | 73.6 | 73.9 | 75.6 | 76.7 | 78.1 | 79.0 | 80.6 | 79.4 | 76.4 | 73.3 | 78.4 | 125.8 |
| 4000 | 87.7 | 87.2 | 87.4 | 84.7 | 80.7 | 78.2 | 76.2 | 75.2 | 77.2 | 79.2 | 81.0 | 82.0 | 84.5 | 83.3 | 81.2 | 76.6 | 82.8 | 130.2 |
| 5000 | 87.7 | 88.2 | 86.5 | 86.5 | 81.7 | 78.7 | 75.4 | 74.5 | 77.0 | 77.0 | 78.8 | 81.0 | 83.5 | 82.7 | 79.2 | 75.3 | 82.9 | 130.3 |
| 6300 | 88.3 | 89.5 | 89.3 | 87.6 | 84.0 | 80.5 | 75.8 | 73.6 | 76.1 | 76.1 | 78.1 | 79.7 | 81.6 | 80.3 | 77.3 | 73.7 | 84.1 | 131.5 |
| 8000 | 89.5 | 90.7 | 89.3 | 86.8 | 84.5 | 81.4 | 77.4 | 74.3 | 76.7 | 78.0 | 79.9 | 80.2 | 83.3 | 81.3 | 78.5 | 75.3 | 85.4 | 132.8 |
| 10000 | 90.4 | 91.1 | 90.4 | 88.7 | 87.0 | 84.0 | 78.2 | 74.8 | 77.2 | 77.5 | 80.3 | 80.2 | 83.3 | 80.2 | 78.2 | 74.5 | 87.4 | 134.8 |
| 12500 | 88.8 | 89.4 | 88.4 | 87.5 | 86.6 | 83.4 | 77.6 | 76.0 | 76.8 | 79.0 | 81.7 | 80.9 | 84.0 | 80.7 | 79.1 | 75.3 | 88.0 | 135.4 |
| 16000 | 85.2 | 86.1 | 85.4 | 85.1 | 83.0 | 78.8 | 72.6 | 71.3 | 74.4 | 75.9 | 77.6 | 79.2 | 80.3 | 78.9 | 77.8 | 72.0 | 86.7 | 134.1 |
| 20000 | 81.6 | 81.7 | 81.0 | 80.1 | 76.9 | 72.8 | 67.9 | 65.9 | 69.7 | 70.9 | 72.4 | 73.6 | 75.3 | 73.6 | 72.6 | 65.9 | 84.4 | 131.8 |
| OVERALL | 99.7 | 99.4 | 98.4 | 96.9 | 95.1 | 93.6 | 92.5 | 91.8 | 92.9 | 93.6 | 94.7 | 95.7 | 97.1 | 96.5 | 95.3 | 94.3 | 97.1 | 144.4 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 83.5 | 91.9 | 95.8 | 96.6 | 96.1 | 96.0 | 95.4 | 95.3 | 97.0 | 97.9 | 98.9 | 99.0 | 99.6 | 96.9 | 92.1 | 84.9 | | |
| 113 METERS | 75.0 | 83.4 | 88.1 | 89.2 | 89.1 | 89.3 | 88.9 | 88.9 | 90.5 | 91.5 | 92.3 | 92.4 | 92.8 | 89.9 | 84.8 | 77.2 | | |

(b) Percent of design speed, 70; fan physical speed, 3615 rpm; fundamental blade passage frequency, 1566 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 77.7 | 77.0 | 77.2 | 76.8 | 77.3 | 78.3 | 78.0 | 78.7 | 79.0 | 80.3 | 81.5 | 82.3 | 84.2 | 84.0 | 85.8 | 88.7 | 81.5 | 128.9 |
| 63 | 80.6 | 87.1 | 86.0 | 83.5 | 82.1 | 87.5 | 84.6 | 84.0 | 83.0 | 86.5 | 89.8 | 84.9 | 90.5 | 89.3 | 88.3 | 89.8 | 86.9 | 134.3 |
| 80 | 75.9 | 75.8 | 74.3 | 74.1 | 74.9 | 75.9 | 74.6 | 75.6 | 78.1 | 79.8 | 81.6 | 83.4 | 86.3 | 87.1 | 89.9 | 91.7 | 83.1 | 130.5 |
| 100 | 77.1 | 76.4 | 76.1 | 76.8 | 76.9 | 77.6 | 77.9 | 79.9 | 81.9 | 83.4 | 84.6 | 86.9 | 88.4 | 89.8 | 92.3 | 92.6 | 85.5 | 132.9 |
| 125 | 83.3 | 81.8 | 83.0 | 82.8 | 82.5 | 82.2 | 81.7 | 82.8 | 85.5 | 87.2 | 87.3 | 88.1 | 89.3 | 90.5 | 92.0 | 91.4 | 86.9 | 134.3 |
| 160 | 81.6 | 82.6 | 82.0 | 83.0 | 83.1 | 82.8 | 83.1 | 83.8 | 84.8 | 85.3 | 85.3 | 87.2 | 87.1 | 88.3 | 89.1 | 87.8 | 85.4 | 132.8 |
| 200 | 82.9 | 83.8 | 81.4 | 84.3 | 83.4 | 81.8 | 81.1 | 82.4 | 82.1 | 82.9 | 83.3 | 85.0 | 87.1 | 87.9 | 88.3 | 87.3 | 84.4 | 131.8 |
| 250 | 84.9 | 86.4 | 82.9 | 82.2 | 83.5 | 84.7 | 84.5 | 83.4 | 86.2 | 88.5 | 87.7 | 88.4 | 88.0 | 89.0 | 88.9 | 87.1 | 86.6 | 134.0 |
| 315 | 83.3 | 82.8 | 82.0 | 82.0 | 82.0 | 83.2 | 83.0 | 84.2 | 85.2 | 86.3 | 86.5 | 86.9 | 87.8 | 88.0 | 87.5 | 85.4 | 85.4 | 132.8 |
| 400 | 85.4 | 84.6 | 83.9 | 82.7 | 83.6 | 83.2 | 83.1 | 84.1 | 88.1 | 86.9 | 87.1 | 87.7 | 88.7 | 89.1 | 87.4 | 85.3 | 86.4 | 133.8 |
| 500 | 85.8 | 87.4 | 84.4 | 83.6 | 84.1 | 86.1 | 83.3 | 83.9 | 85.4 | 87.3 | 87.8 | 88.9 | 88.6 | 89.4 | 87.1 | 85.5 | 86.7 | 134.1 |
| 630 | 88.2 | 87.0 | 88.2 | 91.2 | 86.3 | 84.7 | 86.5 | 86.2 | 85.8 | 87.5 | 87.7 | 87.8 | 89.0 | 88.5 | 87.5 | 85.5 | 87.6 | 135.0 |
| 800 | 88.7 | 86.7 | 85.2 | 84.7 | 85.5 | 86.0 | 85.7 | 86.0 | 86.5 | 86.7 | 87.3 | 88.3 | 89.3 | 88.2 | 86.7 | 84.7 | 86.9 | 134.3 |
| 1000 | 90.2 | 88.0 | 86.5 | 86.7 | 86.4 | 87.0 | 87.5 | 86.9 | 86.0 | 88.0 | 86.9 | 88.1 | 89.2 | 88.7 | 86.4 | 84.8 | 87.5 | 134.9 |
| 1250 | 90.8 | 88.1 | 86.3 | 85.6 | 87.1 | 85.1 | 86.9 | 85.4 | 86.1 | 86.4 | 86.4 | 87.4 | 88.4 | 86.6 | 85.1 | 83.0 | 86.8 | 134.2 |
| 1600 | 95.2 | 97.8 | 90.2 | 96.5 | 101.0 | 94.7 | 87.7 | 92.0 | 88.5 | 91.0 | 88.3 | 93.8 | 92.5 | 90.3 | 89.8 | 86.2 | 94.1 | 141.5 |
| 2000 | 88.9 | 86.6 | 84.4 | 83.6 | 84.8 | 83.1 | 81.8 | 82.3 | 83.6 | 84.1 | 85.0 | 85.4 | 87.3 | 84.6 | 82.9 | 80.2 | 84.7 | 132.1 |
| 2500 | 87.8 | 85.3 | 83.1 | 82.1 | 81.5 | 81.0 | 80.1 | 81.0 | 82.5 | 83.0 | 83.3 | 84.2 | 85.0 | 83.5 | 81.5 | 78.9 | 83.2 | 130.6 |
| 3150 | 92.9 | 91.3 | 89.3 | 86.8 | 83.8 | 83.9 | 81.1 | 81.4 | 82.3 | 83.6 | 84.6 | 86.2 | 86.9 | 86.3 | 82.8 | 79.7 | 86.1 | 133.5 |
| 4000 | 91.0 | 90.2 | 88.2 | 85.9 | 82.7 | 81.9 | 79.9 | 79.5 | 81.9 | 83.0 | 85.0 | 85.8 | 87.2 | 84.9 | 82.9 | 79.6 | 85.5 | 132.9 |
| 5000 | 93.3 | 93.6 | 92.5 | 90.3 | 86.8 | 84.8 | 80.3 | 80.6 | 83.1 | 83.3 | 85.9 | 87.4 | 88.6 | 87.3 | 84.8 | 81.5 | 88.3 | 135.7 |
| 6300 | 92.0 | 93.1 | 92.4 | 91.1 | 87.7 | 84.4 | 80.1 | 78.0 | 81.0 | 80.9 | 82.4 | 84.3 | 84.9 | 83.3 | 80.5 | 77.8 | 87.7 | 135.1 |
| 8000 | 92.5 | 93.5 | 92.2 | 90.2 | 87.7 | 85.2 | 81.0 | 78.2 | 81.0 | 82.4 | 84.5 | 84.3 | 86.7 | 83.9 | 81.5 | 79.2 | 88.7 | 136.1 |
| 10000 | 93.0 | 93.8 | 93.1 | 91.7 | 89.7 | 87.7 | 81.5 | 79.1 | 81.9 | 82.2 | 84.0 | 84.4 | 86.5 | 83.5 | 81.0 | 77.5 | 90.5 | 137.9 |
| 12500 | 91.6 | 92.3 | 91.4 | 91.0 | 89.6 | 87.5 | 81.5 | 79.3 | 81.0 | 82.8 | 85.3 | 84.9 | 87.2 | 83.3 | 81.7 | 78.3 | 91.3 | 138.7 |
| 16000 | 87.6 | 88.4 | 88.0 | 87.7 | 85.8 | 82.9 | 77.1 | 75.8 | 79.6 | 80.7 | 82.4 | 83.2 | 83.8 | 82.1 | 80.7 | 75.5 | 89.9 | 137.3 |
| 20000 | 83.0 | 84.0 | 83.1 | 82.4 | 79.6 | 76.6 | 72.2 | 70.8 | 74.7 | 76.0 | 77.3 | 78.3 | 79.3 | 77.2 | 76.0 | 70.1 | 87.5 | 134.9 |
| OVERALL | 103.7 | 104.1 | 102.1 | 102.3 | 103.2 | 99.9 | 97.4 | 98.0 | 98.4 | 99.7 | 100.1 | 101.3 | 102.2 | 101.6 | 101.3 | 100.6 | 102.0 | 149.4 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| STOILENE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 89.2 | 98.2 | 99.7 | 103.2 | 106.5 | 104.2 | 101.2 | 103.3 | 103.0 | 104.4 | 103.9 | 105.3 | 104.4 | 101.4 | 97.8 | 91.4 | | |

SIDELINE PERCEIVED NOISE LEVELS

| DISTANCE | 61 METERS | 89.2 | 98.2 | 99.7 | 103.2 | 106.5 | 104.2 | 101.2 | 103.3 | 103.0 | 104.4 | 103.9 | 105.3 | 104.4 | 101.4 | 97.8 | 91.4 |
|----------|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
|----------|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|

TABLE XI. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4132 rpm; fundamental blade passage frequency, 1790 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 81.4 | 78.4 | 80.9 | 80.4 | 81.3 | 81.4 | 81.9 | 82.1 | 82.3 | 83.4 | 85.4 | 86.2 | 87.8 | 89.3 | 92.1 | 93.6 | 85.9 | 133.3 |
| | 87.7 | 83.8 | 88.3 | 83.7 | 81.8 | 82.0 | 81.7 | 84.3 | 85.3 | 86.5 | 85.2 | 88.6 | 89.8 | 90.0 | 93.0 | 94.2 | 87.5 | 134.9 |
| | 84.5 | 81.7 | 84.4 | 80.5 | 79.7 | 80.2 | 79.5 | 82.2 | 83.7 | 85.5 | 86.7 | 89.1 | 92.0 | 93.2 | 95.9 | 97.2 | 88.9 | 136.3 |
| 100 | 80.8 | 80.5 | 80.8 | 80.5 | 80.3 | 81.5 | 82.2 | 84.0 | 85.8 | 87.7 | 89.8 | 91.8 | 94.0 | 95.8 | 98.0 | 98.9 | 91.0 | 138.4 |
| 125 | 87.5 | 88.0 | 88.4 | 86.5 | 85.2 | 85.9 | 86.4 | 87.5 | 89.0 | 89.9 | 92.0 | 92.5 | 94.9 | 95.9 | 97.7 | 96.6 | 91.7 | 139.1 |
| 160 | 87.1 | 87.6 | 88.2 | 87.1 | 86.9 | 86.7 | 87.6 | 88.1 | 90.1 | 90.2 | 90.6 | 91.8 | 93.1 | 93.7 | 94.2 | 94.1 | 90.5 | 137.9 |
| 200 | 86.6 | 85.6 | 85.9 | 86.1 | 85.1 | 84.8 | 85.6 | 85.8 | 86.1 | 86.9 | 88.6 | 90.2 | 92.8 | 93.9 | 94.8 | 93.1 | 89.3 | 136.7 |
| 250 | 86.3 | 86.9 | 86.1 | 87.9 | 87.6 | 87.1 | 87.9 | 86.9 | 88.3 | 90.1 | 91.6 | 92.9 | 93.9 | 94.6 | 95.1 | 93.0 | 90.8 | 138.2 |
| 315 | 85.9 | 87.0 | 86.5 | 87.9 | 88.7 | 88.9 | 88.0 | 88.7 | 88.7 | 89.5 | 90.7 | 91.6 | 93.0 | 93.9 | 93.4 | 91.3 | 90.3 | 137.7 |
| 400 | 87.3 | 86.7 | 86.5 | 86.3 | 86.0 | 87.7 | 87.8 | 87.7 | 92.0 | 90.8 | 91.7 | 93.4 | 94.3 | 94.0 | 92.8 | 90.4 | 91.0 | 138.4 |
| 500 | 90.2 | 94.7 | 90.2 | 95.2 | 93.2 | 95.8 | 93.5 | 90.2 | 92.3 | 92.2 | 93.0 | 95.6 | 99.7 | 96.7 | 97.3 | 94.6 | 94.9 | 142.3 |
| 630 | 90.6 | 92.6 | 89.0 | 96.3 | 91.8 | 90.3 | 91.1 | 89.0 | 90.3 | 92.3 | 91.8 | 92.9 | 93.1 | 92.5 | 91.8 | 91.2 | 92.1 | 139.5 |
| 800 | 93.2 | 91.0 | 89.2 | 92.7 | 89.5 | 88.9 | 90.4 | 90.7 | 90.2 | 92.0 | 91.9 | 93.1 | 93.9 | 93.4 | 92.0 | 90.6 | 91.7 | 139.1 |
| 1000 | 94.4 | 92.2 | 91.5 | 90.7 | 91.1 | 91.9 | 91.1 | 91.6 | 92.1 | 92.6 | 92.2 | 93.2 | 93.7 | 92.9 | 92.7 | 91.1 | 92.3 | 139.7 |
| 1250 | 94.7 | 92.5 | 93.7 | 90.5 | 90.2 | 91.2 | 91.2 | 90.3 | 91.2 | 91.7 | 92.2 | 92.6 | 93.5 | 92.5 | 92.0 | 89.7 | 92.0 | 139.4 |
| 1600 | 95.9 | 93.9 | 93.9 | 91.4 | 94.4 | 92.4 | 90.9 | 91.6 | 90.2 | 92.2 | 91.2 | 92.2 | 96.7 | 91.7 | 90.1 | 87.5 | 92.8 | 140.2 |
| 2000 | 96.8 | 94.8 | 95.8 | 92.2 | 96.8 | 94.2 | 92.2 | 92.8 | 90.8 | 93.2 | 91.2 | 92.3 | 98.7 | 92.2 | 90.5 | 87.7 | 94.2 | 141.6 |
| 2500 | 91.5 | 90.4 | 88.5 | 87.9 | 86.5 | 87.7 | 85.2 | 85.7 | 87.9 | 88.2 | 88.7 | 89.5 | 90.0 | 88.7 | 87.2 | 85.0 | 88.5 | 135.9 |
| 3150 | 93.2 | 91.5 | 90.0 | 88.2 | 87.0 | 86.2 | 86.0 | 85.2 | 87.0 | 88.0 | 89.4 | 90.0 | 90.9 | 88.9 | 86.9 | 84.8 | 89.0 | 136.4 |
| 4000 | 93.7 | 92.9 | 92.1 | 92.2 | 90.1 | 89.4 | 86.4 | 84.7 | 86.7 | 87.9 | 90.0 | 90.8 | 92.0 | 89.9 | 87.6 | 85.3 | 90.5 | 137.9 |
| 5000 | 93.5 | 93.2 | 91.7 | 94.4 | 90.5 | 90.0 | 84.5 | 84.0 | 87.0 | 87.2 | 88.7 | 90.3 | 90.8 | 88.7 | 87.7 | 84.1 | 90.7 | 138.1 |
| 6300 | 93.2 | 93.9 | 93.2 | 94.7 | 92.5 | 90.4 | 84.5 | 82.5 | 85.3 | 85.2 | 87.2 | 88.2 | 88.2 | 86.0 | 84.8 | 81.0 | 90.9 | 138.3 |
| 8000 | 93.9 | 94.9 | 93.8 | 92.5 | 91.9 | 89.8 | 84.8 | 83.1 | 85.1 | 86.8 | 88.6 | 88.1 | 89.8 | 86.6 | 84.9 | 83.4 | 91.6 | 139.0 |
| 10000 | 93.4 | 94.4 | 93.5 | 92.3 | 92.3 | 90.0 | 84.5 | 83.0 | 85.2 | 85.7 | 87.7 | 87.7 | 89.5 | 86.4 | 84.5 | 81.2 | 92.3 | 139.7 |
| 12500 | 92.7 | 93.9 | 92.7 | 92.4 | 92.0 | 90.2 | 84.2 | 82.7 | 83.6 | 86.1 | 88.4 | 87.3 | 89.2 | 85.2 | 84.2 | 80.7 | 93.4 | 140.8 |
| 16000 | 87.8 | 89.5 | 89.0 | 89.4 | 88.2 | 85.5 | 79.8 | 79.3 | 83.0 | 84.0 | 85.8 | 86.8 | 86.5 | 84.3 | 83.3 | 78.0 | 92.2 | 139.6 |
| 20000 | 83.6 | 84.9 | 84.1 | 84.3 | 81.4 | 78.8 | 74.9 | 74.6 | 78.7 | 79.7 | 80.8 | 81.9 | 82.6 | 79.7 | 79.1 | 73.2 | 89.9 | 137.3 |
| OVERALL | 106.0 | 105.7 | 105.0 | 105.2 | 104.5 | 103.8 | 102.2 | 101.8 | 102.8 | 103.7 | 104.3 | 105.5 | 107.7 | 106.5 | 107.0 | 106.2 | 105.7 | 153.1 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 92.3 | 99.4 | 103.5 | 105.8 | 107.8 | 107.8 | 106.7 | 107.1 | 107.4 | 108.7 | 108.5 | 108.7 | 110.6 | 105.7 | 102.4 | 96.5 | | |

(d) Percent of design speed, 90; fan physical speed, 4648 rpm; fundamental blade passage frequency, 2014 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | | | 150 | 160 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 85.6 | 82.0 | 85.0 | 84.5 | 84.6 | 85.6 | 85.6 | 86.1 | 87.3 | 87.1 | 88.6 | 90.1 | 92.4 | 93.6 | 97.4 | 99.0 | 90.5 | 137.9 |
| 63 | 82.5 | 85.5 | 84.5 | 84.0 | 84.1 | 84.1 | 84.5 | 84.8 | 85.8 | 86.1 | 88.4 | 90.6 | 93.1 | 95.4 | 98.6 | 100.5 | 91.3 | 138.7 |
| 80 | 91.8 | 91.3 | 93.7 | 93.2 | 91.2 | 88.7 | 87.2 | 93.0 | 89.0 | 88.9 | 92.7 | 93.9 | 96.2 | 98.9 | 101.9 | 103.6 | 95.1 | 142.5 |
| 100 | 86.2 | 84.8 | 85.0 | 85.0 | 85.2 | 86.5 | 87.7 | 88.8 | 91.5 | 92.9 | 94.7 | 96.4 | 99.2 | 101.4 | 104.2 | 105.0 | 96.6 | 144.0 |
| 125 | 91.3 | 88.5 | 89.1 | 89.1 | 89.6 | 90.3 | 91.0 | 92.1 | 93.8 | 94.9 | 95.9 | 98.1 | 99.9 | 101.1 | 103.4 | 102.0 | 96.7 | 144.1 |
| 160 | 91.4 | 91.9 | 92.9 | 92.4 | 92.1 | 92.3 | 92.6 | 93.6 | 93.9 | 94.6 | 95.6 | 96.9 | 98.8 | 99.3 | 99.8 | 99.5 | 95.7 | 143.1 |
| 200 | 90.2 | 90.2 | 90.4 | 91.5 | 92.0 | 91.9 | 90.7 | 90.5 | 91.2 | 91.4 | 93.7 | 95.4 | 98.2 | 99.7 | 100.7 | 98.6 | 94.8 | 142.2 |
| 250 | 92.8 | 92.1 | 92.8 | 96.8 | 97.3 | 98.0 | 95.1 | 93.8 | 95.0 | 94.6 | 96.1 | 98.1 | 99.1 | 100.9 | 100.6 | 98.5 | 97.1 | 144.5 |
| 315 | 89.9 | 93.9 | 96.2 | 98.9 | 96.2 | 92.0 | 94.5 | 92.7 | 93.7 | 94.4 | 95.2 | 98.2 | 98.2 | 99.7 | 99.2 | 97.1 | 96.3 | 143.7 |
| 400 | 89.6 | 91.4 | 91.6 | 95.9 | 96.9 | 94.6 | 92.4 | 92.1 | 92.8 | 95.1 | 95.3 | 97.3 | 98.3 | 98.8 | 98.1 | 95.5 | 95.7 | 143.1 |
| 500 | 94.8 | 97.6 | 97.6 | 104.1 | 102.1 | 100.8 | 97.3 | 92.6 | 94.3 | 96.6 | 97.6 | 98.1 | 99.8 | 98.8 | 99.3 | 96.0 | 99.0 | 146.4 |
| 630 | 92.9 | 91.4 | 97.4 | 95.1 | 97.4 | 95.7 | 93.6 | 93.4 | 93.7 | 95.6 | 96.8 | 97.1 | 98.6 | 97.8 | 96.6 | 94.7 | 96.1 | 143.5 |
| 800 | 95.0 | 94.8 | 97.0 | 94.5 | 94.0 | 95.6 | 94.0 | 93.3 | 95.0 | 95.4 | 95.9 | 96.9 | 98.6 | 98.1 | 96.9 | 94.2 | 95.9 | 143.3 |
| 1000 | 96.6 | 95.0 | 96.0 | 97.0 | 95.0 | 93.8 | 94.1 | 93.5 | 94.5 | 95.1 | 96.1 | 97.4 | 97.6 | 96.1 | 94.5 | 95.8 | 95.8 | 143.2 |
| 1250 | 96.1 | 96.3 | 93.6 | 95.6 | 96.9 | 96.6 | 93.9 | 93.4 | 94.8 | 95.1 | 95.8 | 96.9 | 97.8 | 97.6 | 95.8 | 93.5 | 96.0 | 143.4 |
| 1600 | 96.4 | 93.6 | 92.9 | 93.8 | 93.3 | 92.4 | 91.8 | 91.6 | 93.1 | 93.3 | 94.3 | 95.4 | 96.3 | 95.6 | 93.6 | 91.2 | 94.0 | 141.4 |
| 2000 | 97.3 | 95.6 | 95.5 | 95.5 | 93.0 | 95.1 | 92.5 | 92.3 | 93.6 | 94.6 | 95.9 | 96.4 | 97.4 | 95.6 | 93.9 | 91.5 | 95.2 | 142.6 |
| 2500 | 95.6 | 94.1 | 93.4 | 93.6 | 91.6 | 90.8 | 89.4 | 90.1 | 92.1 | 92.1 | 92.8 | 94.1 | 94.3 | 93.6 | 92.1 | 89.5 | 92.9 | 140.3 |
| 3150 | 94.9 | 94.7 | 94.2 | 93.8 | 92.1 | 90.9 | 89.6 | 89.7 | 91.1 | 92.1 | 92.8 | 93.1 | 93.6 | 92.3 | 91.1 | 89.0 | 92.8 | 140.2 |
| 4000 | 95.5 | 96.0 | 96.2 | 98.2 | 94.5 | 93.7 | 90.8 | 90.3 | 91.3 | 92.7 | 94.2 | 94.7 | 96.2 | 93.2 | 91.4 | 89.1 | 94.8 | 142.2 |
| 5000 | 94.9 | 95.7 | 95.4 | 99.5 | 94.9 | 94.2 | 89.8 | 89.0 | 91.3 | 90.7 | 92.4 | 93.2 | 93.7 | 92.2 | 90.9 | 87.6 | 94.6 | 142.0 |
| 6300 | 94.1 | 95.8 | 95.6 | 97.3 | 94.8 | 93.4 | 88.8 | 86.8 | 89.4 | 89.0 | 90.8 | 91.3 | 92.0 | 90.0 | 89.0 | 85.0 | 93.8 | 141.2 |
| 8000 | 94.4 | 95.8 | 95.7 | 95.1 | 93.8 | 92.1 | 88.7 | 86.8 | 89.2 | 90.6 | 92.1 | 91.2 | 92.6 | 89.6 | 88.4 | 85.8 | 94.1 | 141.5 |
| 10000 | 94.0 | 94.6 | 95.0 | 94.0 | 93.1 | 92.0 | 87.5 | 86.5 | 89.0 | 88.7 | 91.0 | 90.6 | 92.5 | 89.0 | 87.7 | 85.3 | 94.3 | 141.7 |
| 12500 | 92.4 | 93.8 | 93.3 | 93.0 | 91.6 | 90.4 | 86.1 | 85.8 | 87.1 | 89.2 | 91.0 | 90.3 | 91.5 | 88.0 | 86.5 | 83.8 | 94.7 | 142.1 |
| 16000 | 89.3 | 90.8 | 90.6 | 91.3 | 89.3 | 87.9 | 83.1 | 82.8 | 86.7 | 87.7 | 88.6 | 89.6 | 89.1 | 87.2 | 85.7 | 81.3 | 94.6 | 142.0 |
| 20000 | 84.3 | 84.9 | 84.9 | 85.4 | 82.2 | 80.7 | 78.4 | 78.0 | 82.7 | 84.2 | 84.7 | 85.2 | 85.7 | 83.2 | 82.2 | 76.3 | 92.5 | 139.9 |
| OVERALL | 107.8 | 107.9 | 108.4 | 110.2 | 108.8 | 108.0 | 105.9 | 105.3 | 106.5 | 107.3 | 108.5 | 109.7 | 111.0 | 111.4 | 112.1 | 111.6 | 109.5 | 156.9 |
| SIDE LINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 94.0 | 101.9 | 106.7 | 110.9 | 110.6 | 111.1 | 105.7 | 109.7 | 111.1 | 111.8 | 112.7 | 112.7 | 112.7 | 109.9 | 106.6 | 100.8 | | |
| 305 METERS | 69.3 | 80.2 | 86.0 | 91.9 | 92.6 | 93.2 | 92.1 | 92.3 | 93.8 | 94.4 | 95.1 | 95.1 | 94.7 | 92.0 | 88.7 | 82.6 | | |

TABLE XII. - NOISE OF FAN C CONFIGURATION 310 (TREATED WALL INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST,
NOMINAL NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.0002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3072 rpm; fundamental blade passage frequency, 1331 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 91.1 | 80.4 | 82.9 | 77.6 | 80.9 | 76.9 | 82.4 | 75.6 | 78.6 | 76.7 | 77.7 | 78.0 | 78.1 | 79.6 | 82.2 | 82.4 | 80.3 | 127.7 |
| 63 | 104.2 | 73.6 | 71.9 | 71.1 | 71.7 | 72.1 | 72.2 | 71.2 | 72.1 | 73.1 | 74.7 | 76.2 | 78.2 | 79.6 | 81.9 | 82.3 | 86.5 | 133.9 |
| 80 | 80.9 | 72.9 | 72.0 | 71.7 | 72.0 | 71.4 | 71.2 | 72.0 | 73.0 | 75.5 | 77.5 | 78.6 | 80.9 | 82.5 | 84.4 | 85.1 | 78.1 | 125.5 |
| 100 | 86.2 | 85.2 | 85.7 | 79.3 | 82.0 | 81.7 | 79.2 | 80.2 | 80.0 | 79.0 | 80.7 | 84.3 | 84.2 | 85.2 | 86.0 | 86.9 | 82.8 | 130.2 |
| 125 | 79.4 | 77.5 | 77.5 | 77.2 | 77.2 | 77.5 | 77.5 | 77.7 | 79.4 | 80.0 | 80.9 | 82.1 | 82.7 | 84.7 | 84.9 | 84.4 | 80.7 | 128.1 |
| 160 | 81.3 | 80.3 | 80.2 | 78.8 | 77.8 | 78.3 | 78.8 | 80.3 | 80.2 | 80.3 | 80.7 | 83.6 | 81.5 | 82.8 | 83.8 | 82.9 | 80.9 | 128.3 |
| 200 | 83.9 | 84.7 | 79.5 | 77.4 | 77.5 | 79.2 | 75.0 | 74.7 | 76.0 | 77.4 | 78.0 | 79.6 | 81.5 | 82.5 | 82.4 | 80.7 | 79.4 | 126.8 |
| 250 | 81.7 | 80.7 | 78.1 | 77.2 | 77.2 | 76.9 | 77.9 | 77.6 | 79.4 | 80.4 | 80.7 | 82.2 | 82.6 | 83.1 | 82.4 | 80.8 | 80.2 | 127.6 |
| 315 | 81.7 | 79.6 | 78.2 | 78.1 | 77.2 | 78.4 | 77.9 | 77.4 | 78.6 | 79.7 | 80.2 | 81.1 | 82.2 | 82.9 | 81.7 | 79.4 | 79.8 | 127.2 |
| 400 | 83.4 | 80.4 | 79.6 | 78.9 | 77.8 | 77.8 | 76.9 | 77.3 | 79.1 | 80.8 | 81.8 | 82.7 | 83.6 | 83.4 | 81.6 | 79.5 | 80.7 | 128.1 |
| 500 | 84.5 | 81.7 | 80.4 | 78.9 | 78.7 | 77.7 | 77.0 | 77.0 | 78.2 | 80.4 | 80.9 | 82.3 | 83.2 | 83.9 | 81.9 | 78.9 | 80.6 | 128.0 |
| 630 | 85.9 | 82.0 | 80.7 | 79.7 | 79.0 | 77.7 | 77.0 | 77.4 | 78.2 | 79.5 | 80.7 | 82.1 | 83.2 | 83.0 | 80.9 | 77.9 | 80.5 | 127.9 |
| 800 | 88.5 | 84.2 | 82.3 | 81.0 | 79.5 | 78.2 | 78.2 | 77.8 | 78.8 | 79.5 | 80.5 | 81.6 | 83.0 | 83.2 | 80.5 | 78.2 | 81.0 | 128.4 |
| 1000 | 90.1 | 85.6 | 83.5 | 81.5 | 80.0 | 78.8 | 78.9 | 78.5 | 78.9 | 79.7 | 80.1 | 81.2 | 82.6 | 81.7 | 79.9 | 77.4 | 81.3 | 128.7 |
| 1250 | 97.0 | 94.0 | 87.9 | 88.0 | 85.7 | 82.2 | 81.7 | 82.2 | 81.2 | 82.0 | 83.9 | 82.8 | 84.0 | 82.9 | 81.5 | 79.1 | 86.0 | 133.4 |
| 1600 | 91.4 | 86.5 | 82.4 | 81.0 | 79.5 | 77.7 | 77.1 | 76.9 | 77.4 | 78.1 | 78.9 | 79.8 | 81.2 | 80.2 | 77.9 | 75.4 | 80.7 | 128.1 |
| 2000 | 90.0 | 85.9 | 82.0 | 79.9 | 78.2 | 77.4 | 76.0 | 75.9 | 76.9 | 77.0 | 77.5 | 78.5 | 80.9 | 79.9 | 77.2 | 74.4 | 79.9 | 127.3 |
| 2500 | 94.8 | 93.1 | 89.8 | 86.6 | 82.5 | 80.5 | 78.1 | 76.8 | 77.8 | 78.0 | 78.5 | 79.1 | 81.0 | 81.0 | 78.3 | 76.7 | 84.4 | 131.8 |
| 3150 | 91.3 | 89.5 | 87.5 | 84.4 | 80.7 | 78.0 | 75.8 | 74.7 | 75.5 | 76.5 | 77.5 | 79.1 | 80.5 | 79.5 | 77.2 | 74.7 | 82.1 | 129.5 |
| 4000 | 94.3 | 93.3 | 93.3 | 92.3 | 87.7 | 84.2 | 80.5 | 77.2 | 78.3 | 79.8 | 81.5 | 82.6 | 85.0 | 83.5 | 81.5 | 77.7 | 87.4 | 134.8 |
| 5000 | 93.7 | 92.9 | 91.9 | 92.9 | 89.4 | 84.9 | 80.6 | 77.1 | 77.9 | 78.1 | 79.9 | 81.5 | 83.6 | 83.2 | 79.9 | 76.2 | 87.5 | 134.9 |
| 6300 | 93.1 | 92.9 | 93.1 | 92.2 | 89.2 | 84.9 | 80.1 | 75.2 | 76.4 | 76.6 | 78.7 | 80.1 | 81.7 | 80.9 | 77.9 | 74.0 | 87.7 | 135.1 |
| 8000 | 93.0 | 92.8 | 91.7 | 89.6 | 87.0 | 83.5 | 78.7 | 75.2 | 76.5 | 78.2 | 79.7 | 80.4 | 83.0 | 80.7 | 78.2 | 74.4 | 87.3 | 134.7 |
| 10000 | 93.2 | 92.3 | 92.0 | 90.6 | 88.4 | 85.3 | 79.5 | 75.4 | 77.1 | 77.4 | 79.9 | 79.7 | 82.7 | 80.3 | 77.6 | 72.6 | 88.7 | 136.1 |
| 12500 | 91.2 | 90.4 | 89.5 | 88.9 | 87.4 | 84.0 | 77.3 | 75.4 | 76.1 | 78.6 | 80.9 | 80.2 | 82.7 | 79.4 | 78.1 | 72.7 | 88.6 | 136.0 |
| 16000 | 88.5 | 87.2 | 86.9 | 86.7 | 84.9 | 79.9 | 73.0 | 71.1 | 74.5 | 76.2 | 78.5 | 78.5 | 79.3 | 77.2 | 76.2 | 69.4 | 87.8 | 135.2 |
| 20000 | 86.1 | 84.8 | 84.2 | 84.3 | 80.8 | 75.4 | 69.6 | 66.4 | 70.5 | 73.7 | 73.0 | 74.0 | 75.8 | 73.3 | 71.8 | 64.6 | 87.4 | 134.8 |
| OVERALL | 107.5 | 103.0 | 101.6 | 100.6 | 98.0 | 95.0 | 92.5 | 91.3 | 92.2 | 93.0 | 94.2 | 95.3 | 96.5 | 96.4 | 95.5 | 94.3 | 98.9 | 146.3 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 91.0 | 97.0 | 100.3 | 101.9 | 100.7 | 99.2 | 97.3 | 95.8 | 96.9 | 97.8 | 98.7 | 99.0 | 99.5 | 96.9 | 92.4 | 85.3 | | |
| 113 METERS | 81.8 | 89.1 | 92.5 | 94.5 | 93.5 | 92.3 | 90.7 | 89.3 | 90.5 | 91.3 | 92.1 | 92.3 | 92.7 | 89.9 | 85.1 | 77.9 | | |

(b) Percent of design speed, 70; fan physical speed, 3583 rpm; fundamental blade passage frequency, 1552 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 91.4 | 76.6 | 76.9 | 78.2 | 77.4 | 78.1 | 77.6 | 78.6 | 79.2 | 79.7 | 80.6 | 81.7 | 83.6 | 84.7 | 86.2 | 87.9 | 81.9 | 129.3 |
| 63 | 104.6 | 82.4 | 78.1 | 86.7 | 80.6 | 80.9 | 79.2 | 79.7 | 78.7 | 81.4 | 81.9 | 83.8 | 85.6 | 85.7 | 88.1 | 89.6 | 88.2 | 135.6 |
| 80 | 82.1 | 76.4 | 74.1 | 74.1 | 75.1 | 75.8 | 75.8 | 77.3 | 78.8 | 80.9 | 82.3 | 84.0 | 86.4 | 88.6 | 90.9 | 92.5 | 84.0 | 131.4 |
| 100 | 80.2 | 77.2 | 77.4 | 77.9 | 77.2 | 78.5 | 79.4 | 81.2 | 82.7 | 84.2 | 85.7 | 87.3 | 88.9 | 91.0 | 92.4 | 92.7 | 86.1 | 133.5 |
| 125 | 84.9 | 81.1 | 82.6 | 84.3 | 83.3 | 83.3 | 83.1 | 84.1 | 85.4 | 86.1 | 87.1 | 88.5 | 89.3 | 90.4 | 92.3 | 91.0 | 87.0 | 134.4 |
| 160 | 84.1 | 82.7 | 83.1 | 82.1 | 82.7 | 83.2 | 83.1 | 84.1 | 84.9 | 85.1 | 85.6 | 86.3 | 87.1 | 87.9 | 88.4 | 87.3 | 85.2 | 132.6 |
| 200 | 85.2 | 82.7 | 81.9 | 81.7 | 80.9 | 80.9 | 80.7 | 81.7 | 82.1 | 82.4 | 84.1 | 85.5 | 87.2 | 88.2 | 88.9 | 87.0 | 84.3 | 131.7 |
| 250 | 86.8 | 87.1 | 86.0 | 86.1 | 83.0 | 85.8 | 83.3 | 82.8 | 86.6 | 88.6 | 88.1 | 88.6 | 88.8 | 89.3 | 89.3 | 88.2 | 87.1 | 134.5 |
| 315 | 84.8 | 82.1 | 81.6 | 82.1 | 81.8 | 81.9 | 83.1 | 83.4 | 84.8 | 84.3 | 85.1 | 86.5 | 87.9 | 87.9 | 87.8 | 85.0 | 84.9 | 132.3 |
| 400 | 86.0 | 83.4 | 83.7 | 82.2 | 85.0 | 81.7 | 83.4 | 83.4 | 86.4 | 85.9 | 87.4 | 87.8 | 88.0 | 88.2 | 87.0 | 85.4 | 85.9 | 133.3 |
| 500 | 87.2 | 85.7 | 85.1 | 84.1 | 84.2 | 85.1 | 82.6 | 83.7 | 86.7 | 87.6 | 86.9 | 88.3 | 88.6 | 88.2 | 86.6 | 84.3 | 86.4 | 133.8 |
| 630 | 88.7 | 89.2 | 92.7 | 89.4 | 87.4 | 83.5 | 86.5 | 86.9 | 84.7 | 88.9 | 88.9 | 87.8 | 88.9 | 88.9 | 86.4 | 85.1 | 88.1 | 135.5 |
| 800 | 92.1 | 87.9 | 86.1 | 85.1 | 85.4 | 84.6 | 83.6 | 84.3 | 84.1 | 85.3 | 86.1 | 87.0 | 88.1 | 88.1 | 85.8 | 83.6 | 86.1 | 133.5 |
| 1000 | 93.8 | 90.5 | 90.1 | 86.8 | 84.8 | 87.8 | 87.6 | 84.8 | 85.1 | 87.0 | 85.5 | 87.1 | 88.5 | 88.1 | 86.0 | 83.9 | 87.4 | 134.8 |
| 1250 | 94.4 | 90.7 | 88.0 | 87.4 | 85.5 | 87.0 | 84.9 | 84.4 | 84.7 | 85.2 | 85.2 | 86.5 | 87.4 | 86.4 | 84.5 | 81.9 | 86.7 | 134.1 |
| 1600 | 103.1 | 100.3 | 97.1 | 100.1 | 94.4 | 100.8 | 87.6 | 93.4 | 92.8 | 90.8 | 88.1 | 93.0 | 90.8 | 89.9 | 89.4 | 85.7 | 95.6 | 143.0 |
| 2000 | 93.6 | 90.1 | 87.8 | 86.8 | 84.3 | 84.4 | 81.4 | 82.4 | 83.1 | 82.9 | 83.8 | 84.7 | 86.6 | 84.8 | 82.6 | 80.0 | 85.4 | 132.8 |
| 2500 | 94.2 | 92.2 | 89.7 | 86.3 | 84.0 | 82.5 | 81.0 | 81.0 | 82.5 | 82.3 | 83.0 | 83.2 | 85.1 | 83.8 | 81.8 | 79.4 | 85.4 | 132.8 |
| 3150 | 99.6 | 97.9 | 96.6 | 94.6 | 90.4 | 86.7 | 84.9 | 83.2 | 84.6 | 84.2 | 84.9 | 86.7 | 88.1 | 86.4 | 85.1 | 82.6 | 90.8 | 138.2 |
| 4000 | 97.7 | 96.5 | 94.7 | 94.3 | 90.2 | 86.8 | 83.2 | 81.5 | 82.0 | 83.3 | 85.2 | 85.8 | 88.0 | 85.3 | 83.5 | 80.4 | 89.9 | 137.3 |
| 5000 | 100.1 | 99.1 | 96.8 | 98.9 | 95.4 | 91.4 | 86.1 | 82.9 | 84.1 | 83.7 | 86.4 | 87.0 | 90.1 | 87.7 | 85.9 | 82.3 | 93.4 | 140.8 |
| 6300 | 97.0 | 96.6 | 97.4 | 96.7 | 94.5 | 90.4 | 85.4 | 81.1 | 82.1 | 81.8 | 83.6 | 84.6 | 85.7 | 83.8 | 81.7 | 78.8 | 92.2 | 139.6 |
| 8000 | 95.8 | 96.3 | 95.5 | 93.8 | 91.8 | 89.3 | 83.3 | 79.9 | 81.2 | 82.4 | 84.9 | 84.4 | 86.9 | 83.6 | 81.2 | 78.3 | 91.3 | 138.7 |
| 10000 | 95.5 | 95.0 | 95.0 | 94.2 | 92.2 | 90.6 | 84.1 | 80.5 | 81.9 | 81.5 | 84.3 | 83.9 | 86.1 | 82.5 | 80.7 | 76.3 | 92.2 | 139.6 |
| 12500 | 93.5 | 93.2 | 92.4 | 92.0 | 91.1 | 89.0 | 82.0 | 79.6 | 80.2 | 82.5 | 85.1 | 83.9 | 86.3 | 81.2 | 80.6 | 76.1 | 92.0 | 139.4 |
| 16000 | 89.9 | 89.7 | 89.6 | 89.6 | 87.7 | 84.3 | 77.5 | 76.1 | 79.8 | 80.4 | 83.3 | 83.3 | 83.3 | 80.0 | 79.3 | 73.5 | 91.0 | 138.4 |
| 20000 | 87.4 | 87.0 | 86.5 | 86.8 | 83.3 | 79.4 | 74.3 | 71.8 | 76.3 | 76.8 | 77.7 | 78.7 | 80.0 | 77.0 | 75.6 | 68.6 | 90.2 | 137.6 |
| OVERALL | 110.3 | 107.3 | 106.0 | 106.2 | 103.0 | 103.5 | 97.8 | 98.3 | 98.9 | 99.3 | 99.7 | 100.9 | 101.9 | 101.5 | 101.4 | 100.5 | 103.7 | 151.1 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 95.6 | 101.6 | 104.8 | 107.3 | 106.3 | 108.2 | 102.6 | 104.2 | 104.7 | 104.1 | 103.8 | 104.8 | 104.4 | 101.4 | 97.8 | 91.4 | | |

TABLE XII. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4095 rpm; fundamental blade passage frequency, 1774 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 91.5 | 81.3 | 81.5 | 81.3 | 81.7 | 81.8 | 82.0 | 82.8 | 83.7 | 84.3 | 85.0 | 86.8 | 87.7 | 90.2 | 92.7 | 94.6 | 86.7 | 134.1 |
| | 104.4 | 84.4 | 89.6 | 85.2 | 82.6 | 82.7 | 82.7 | 81.9 | 84.9 | 84.4 | 86.6 | 88.2 | 89.7 | 90.7 | 93.6 | 95.3 | 90.1 | 137.5 |
| | 88.2 | 83.0 | 83.5 | 80.9 | 80.2 | 80.5 | 80.5 | 81.2 | 83.5 | 85.2 | 87.5 | 89.6 | 92.4 | 94.4 | 97.2 | 98.4 | 89.8 | 137.2 |
| 100 | 95.6 | 83.1 | 81.6 | 81.8 | 81.8 | 83.8 | 83.6 | 85.3 | 87.3 | 89.1 | 90.9 | 92.7 | 94.6 | 96.8 | 98.9 | 99.5 | 91.9 | 139.3 |
| 125 | 90.6 | 87.4 | 86.2 | 85.7 | 87.2 | 87.4 | 88.2 | 88.7 | 89.9 | 91.1 | 92.4 | 93.8 | 95.6 | 96.6 | 98.6 | 97.0 | 92.5 | 139.9 |
| 160 | 90.6 | 88.6 | 87.6 | 87.4 | 88.1 | 87.9 | 88.4 | 89.8 | 89.8 | 90.4 | 91.1 | 92.4 | 93.4 | 94.8 | 95.9 | 93.8 | 91.2 | 138.6 |
| 200 | 91.4 | 87.7 | 86.2 | 86.4 | 85.7 | 85.9 | 85.6 | 85.7 | 86.9 | 87.6 | 88.9 | 90.8 | 93.4 | 94.6 | 95.4 | 92.8 | 89.9 | 137.3 |
| 250 | 92.1 | 89.3 | 87.1 | 87.3 | 87.4 | 88.6 | 86.3 | 87.9 | 88.6 | 90.8 | 91.9 | 93.0 | 94.3 | 95.4 | 95.6 | 93.0 | 91.2 | 138.6 |
| 315 | 89.6 | 90.3 | 89.3 | 87.9 | 88.1 | 89.4 | 88.1 | 88.1 | 89.1 | 89.9 | 90.8 | 92.4 | 93.8 | 94.4 | 93.9 | 91.0 | 90.8 | 138.2 |
| 400 | 90.1 | 87.9 | 89.1 | 87.6 | 87.9 | 88.9 | 86.9 | 90.1 | 88.9 | 91.1 | 90.9 | 92.5 | 93.9 | 94.3 | 93.1 | 89.7 | 90.9 | 138.3 |
| 500 | 95.5 | 94.5 | 95.9 | 97.7 | 96.7 | 98.9 | 93.2 | 94.5 | 95.0 | 90.5 | 93.0 | 95.8 | 99.9 | 96.2 | 96.2 | 93.4 | 96.1 | 143.5 |
| 630 | 96.0 | 94.4 | 92.4 | 98.5 | 93.9 | 91.2 | 90.7 | 88.7 | 90.7 | 91.7 | 91.9 | 92.6 | 94.4 | 93.2 | 93.0 | 90.8 | 93.1 | 140.5 |
| 800 | 98.9 | 95.2 | 92.4 | 94.4 | 91.2 | 91.4 | 90.9 | 88.7 | 89.0 | 90.4 | 91.4 | 92.5 | 93.7 | 93.5 | 92.0 | 89.8 | 92.2 | 139.6 |
| 1000 | 99.7 | 95.7 | 96.2 | 93.9 | 93.1 | 94.2 | 91.7 | 91.6 | 90.1 | 92.1 | 91.9 | 93.8 | 93.7 | 93.2 | 93.1 | 91.3 | 93.4 | 140.8 |
| 1250 | 99.0 | 96.6 | 95.5 | 96.3 | 94.1 | 92.1 | 90.8 | 89.8 | 90.0 | 90.5 | 90.8 | 92.4 | 93.5 | 92.3 | 91.3 | 89.0 | 93.0 | 140.4 |
| 1600 | 102.2 | 101.6 | 100.7 | 99.2 | 99.2 | 96.9 | 93.9 | 91.4 | 91.2 | 91.4 | 92.2 | 93.0 | 97.1 | 92.9 | 92.7 | 88.5 | 96.3 | 143.7 |
| 2000 | 103.8 | 102.6 | 101.1 | 99.6 | 99.6 | 97.3 | 94.1 | 91.4 | 91.3 | 91.6 | 92.3 | 92.9 | 97.1 | 92.9 | 92.8 | 88.2 | 96.8 | 144.2 |
| 2500 | 99.3 | 97.8 | 96.0 | 95.0 | 94.3 | 92.0 | 87.8 | 86.8 | 87.5 | 88.0 | 88.8 | 90.1 | 90.5 | 89.2 | 87.7 | 85.2 | 92.1 | 139.5 |
| 3150 | 100.7 | 99.2 | 97.7 | 96.7 | 96.4 | 92.5 | 88.9 | 87.0 | 87.3 | 87.8 | 89.5 | 90.8 | 91.3 | 89.5 | 87.8 | 85.8 | 93.5 | 140.9 |
| 4000 | 101.6 | 100.7 | 99.2 | 99.4 | 99.1 | 96.1 | 91.1 | 87.6 | 87.6 | 88.4 | 90.2 | 91.7 | 92.7 | 89.9 | 88.4 | 85.8 | 95.6 | 143.0 |
| 5000 | 100.1 | 99.6 | 97.7 | 100.6 | 99.7 | 97.1 | 91.1 | 88.1 | 88.1 | 88.2 | 89.6 | 91.2 | 91.4 | 90.1 | 88.1 | 84.3 | 95.9 | 143.3 |
| 6300 | 98.8 | 98.7 | 98.0 | 99.9 | 99.0 | 96.9 | 90.5 | 86.5 | 86.8 | 86.2 | 87.7 | 88.5 | 88.7 | 87.6 | 86.0 | 82.3 | 95.6 | 143.0 |
| 8000 | 98.4 | 99.0 | 97.9 | 97.3 | 97.2 | 95.7 | 89.3 | 85.9 | 85.9 | 86.9 | 88.8 | 88.6 | 90.1 | 86.7 | 85.7 | 83.0 | 95.2 | 142.6 |
| 10000 | 97.0 | 97.0 | 96.0 | 96.0 | 95.7 | 94.5 | 87.8 | 84.3 | 84.7 | 84.7 | 87.5 | 87.7 | 89.2 | 85.7 | 83.8 | 79.5 | 94.7 | 142.1 |
| 12500 | 94.6 | 94.9 | 93.4 | 93.6 | 93.4 | 92.6 | 85.5 | 83.1 | 83.3 | 85.2 | 87.7 | 87.1 | 88.8 | 83.3 | 82.6 | 78.6 | 94.2 | 141.6 |
| 16000 | 90.7 | 92.3 | 90.4 | 90.9 | 90.7 | 88.5 | 80.3 | 79.4 | 82.8 | 83.0 | 86.3 | 86.3 | 86.4 | 82.6 | 81.6 | 76.2 | 93.4 | 140.8 |
| 20000 | 87.4 | 90.2 | 87.4 | 88.5 | 86.5 | 83.7 | 77.4 | 75.7 | 79.4 | 81.0 | 81.5 | 82.3 | 83.4 | 79.4 | 78.2 | 73.1 | 92.8 | 140.2 |
| OVERALL | 112.5 | 110.7 | 109.5 | 109.8 | 109.0 | 107.5 | 103.7 | 102.6 | 103.0 | 103.4 | 104.5 | 105.8 | 107.9 | 107.1 | 107.7 | 106.6 | 107.8 | 155.2 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 98.9 | 105.5 | 108.4 | 111.3 | 112.6 | 111.8 | 108.8 | 107.4 | 107.8 | 108.1 | 108.7 | 109.3 | 110.2 | 106.3 | 103.5 | 96.6 | | |

(d) Percent of design speed, 90; fan physical speed, 4607 rpm; fundamental blade passage frequency, 1996 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 92.0 | 83.3 | 84.7 | 85.0 | 85.3 | 85.7 | 86.3 | 86.5 | 87.3 | 88.0 | 89.3 | 90.6 | 92.7 | 94.5 | 97.5 | 100.4 | 91.2 | 138.6 |
| 63 | 104.3 | 85.6 | 84.6 | 84.5 | 84.3 | 85.0 | 84.8 | 84.8 | 86.1 | 86.6 | 89.0 | 91.1 | 93.6 | 96.1 | 98.6 | 101.2 | 92.8 | 140.2 |
| 80 | 92.0 | 88.7 | 89.5 | 87.3 | 87.3 | 89.3 | 84.5 | 87.3 | 89.5 | 90.7 | 92.2 | 93.9 | 97.2 | 99.3 | 102.3 | 104.4 | 95.1 | 142.5 |
| 100 | 88.3 | 86.2 | 86.3 | 85.5 | 85.8 | 87.3 | 88.3 | 89.8 | 91.8 | 93.3 | 95.8 | 97.3 | 99.5 | 102.3 | 104.8 | 104.6 | 97.1 | 144.5 |
| 125 | 93.8 | 90.2 | 89.8 | 90.2 | 91.2 | 91.7 | 92.2 | 92.5 | 94.2 | 96.0 | 97.0 | 98.3 | 100.0 | 102.0 | 104.5 | 102.9 | 97.5 | 144.9 |
| 160 | 95.0 | 91.7 | 93.0 | 91.7 | 93.7 | 92.5 | 93.7 | 94.0 | 94.7 | 95.0 | 96.2 | 97.1 | 98.7 | 100.5 | 101.0 | 99.6 | 96.3 | 143.7 |
| 200 | 94.1 | 91.6 | 92.4 | 94.7 | 93.9 | 93.9 | 93.6 | 91.6 | 91.9 | 92.9 | 94.1 | 95.8 | 98.2 | 100.6 | 101.1 | 98.6 | 95.7 | 143.1 |
| 250 | 98.3 | 94.3 | 96.5 | 101.5 | 99.7 | 99.5 | 99.0 | 95.3 | 95.7 | 96.5 | 96.3 | 98.3 | 99.5 | 101.2 | 101.2 | 98.7 | 98.6 | 146.0 |
| 315 | 92.5 | 96.9 | 102.9 | 103.9 | 100.2 | 94.4 | 93.2 | 93.0 | 93.4 | 95.5 | 95.9 | 98.5 | 99.0 | 100.0 | 99.7 | 96.9 | 98.3 | 145.7 |
| 400 | 93.5 | 93.0 | 93.5 | 96.8 | 98.1 | 95.1 | 93.6 | 92.6 | 93.3 | 94.8 | 95.5 | 97.6 | 98.8 | 99.6 | 98.5 | 95.4 | 96.3 | 143.7 |
| 500 | 99.6 | 99.8 | 100.0 | 104.6 | 103.0 | 100.3 | 97.8 | 95.0 | 95.0 | 97.6 | 99.5 | 97.9 | 100.8 | 99.1 | 100.0 | 95.9 | 99.8 | 147.2 |
| 630 | 94.7 | 93.4 | 98.0 | 96.7 | 97.9 | 94.7 | 93.9 | 94.2 | 92.4 | 95.5 | 97.2 | 97.8 | 98.5 | 98.4 | 97.0 | 93.7 | 96.4 | 143.8 |
| 800 | 101.7 | 98.7 | 98.0 | 97.8 | 96.5 | 96.5 | 96.1 | 92.6 | 94.5 | 95.0 | 96.5 | 96.9 | 98.5 | 98.8 | 96.5 | 93.5 | 96.8 | 144.2 |
| 1000 | 101.4 | 98.8 | 95.9 | 99.8 | 96.8 | 95.3 | 94.6 | 93.1 | 93.6 | 94.8 | 95.6 | 97.2 | 98.1 | 97.9 | 95.8 | 93.6 | 96.5 | 143.9 |
| 1250 | 101.2 | 100.7 | 99.9 | 100.5 | 101.7 | 97.5 | 94.7 | 93.5 | 94.0 | 94.5 | 95.7 | 97.3 | 97.7 | 97.4 | 95.4 | 92.4 | 97.7 | 145.1 |
| 1600 | 103.9 | 98.1 | 99.1 | 96.8 | 96.8 | 93.9 | 92.4 | 92.4 | 92.4 | 93.4 | 94.3 | 95.5 | 96.4 | 95.6 | 93.6 | 90.5 | 95.4 | 142.8 |
| 2000 | 105.8 | 104.1 | 102.9 | 101.4 | 100.8 | 98.1 | 94.3 | 93.3 | 94.1 | 94.4 | 95.9 | 97.0 | 97.8 | 96.4 | 94.6 | 91.3 | 98.6 | 146.0 |
| 2500 | 102.3 | 101.0 | 101.6 | 101.1 | 98.3 | 95.8 | 92.0 | 91.8 | 92.1 | 92.6 | 93.5 | 93.9 | 94.6 | 94.1 | 92.3 | 89.5 | 96.6 | 144.0 |
| 3150 | 101.5 | 100.3 | 100.8 | 100.3 | 98.8 | 95.2 | 92.7 | 91.3 | 91.5 | 92.5 | 93.3 | 93.9 | 94.3 | 93.5 | 91.8 | 88.9 | 96.4 | 143.8 |
| 4000 | 102.7 | 101.9 | 102.6 | 103.7 | 101.2 | 98.7 | 93.9 | 92.6 | 91.7 | 93.2 | 95.1 | 95.8 | 96.6 | 93.4 | 92.2 | 89.3 | 98.7 | 146.1 |
| 5000 | 100.9 | 100.5 | 100.5 | 103.4 | 100.9 | 97.7 | 93.2 | 91.4 | 92.0 | 92.0 | 93.4 | 94.2 | 94.4 | 92.7 | 92.0 | 88.0 | 98.0 | 145.4 |
| 6300 | 99.5 | 99.5 | 99.6 | 101.4 | 99.1 | 95.5 | 92.1 | 89.1 | 90.2 | 90.1 | 91.5 | 92.0 | 92.0 | 90.6 | 89.6 | 85.6 | 96.7 | 144.1 |
| 8000 | 98.4 | 99.4 | 99.1 | 98.5 | 97.5 | 95.2 | 90.6 | 88.1 | 88.9 | 90.4 | 92.2 | 91.2 | 93.0 | 89.2 | 88.9 | 85.8 | 96.3 | 143.7 |
| 10000 | 97.3 | 96.9 | 97.3 | 96.6 | 95.1 | 93.5 | 89.3 | 86.6 | 88.0 | 88.3 | 90.8 | 90.0 | 91.8 | 87.8 | 87.6 | 83.9 | 95.5 | 142.9 |
| 12500 | 94.6 | 94.3 | 94.1 | 93.9 | 93.2 | 92.0 | 86.6 | 85.9 | 86.1 | 88.1 | 90.8 | 89.4 | 91.1 | 85.6 | 85.6 | 81.5 | 95.0 | 142.4 |
| 16000 | 90.7 | 90.2 | 91.2 | 92.1 | 91.2 | 87.9 | 82.7 | 82.7 | 85.8 | 86.9 | 89.6 | 89.3 | 88.9 | 84.8 | 84.8 | 79.1 | 94.8 | 142.2 |
| 20000 | 87.9 | 87.5 | 88.0 | 89.6 | 86.8 | 83.5 | 79.9 | 79.0 | 83.2 | 84.0 | 84.8 | 86.1 | 87.0 | 82.6 | 82.0 | 76.1 | 94.3 | 141.7 |
| OVERALL | 113.8 | 112.1 | 112.5 | 113.6 | 112.1 | 109.6 | 107.4 | 106.0 | 106.5 | 107.7 | 109.0 | 110.0 | 111.3 | 112.0 | 112.7 | 111.8 | 111.0 | 158.4 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 100.8 | 107.2 | 111.8 | 115.4 | 115.5 | 114.3 | 111.9 | 111.0 | 111.2 | 112.3 | 113.3 | 113.3 | 113.1 | 110.5 | 107.2 | 100.7 | | |
| 305 METERS | 74.7 | 85.3 | 91.3 | 95.0 | 96.3 | 95.4 | 93.8 | 93.2 | 94.0 | 94.7 | 95.4 | 95.5 | 95.1 | 92.6 | 89.2 | 82.4 | | |

TABLE XIII. - NOISE OF FAN C CONFIGURATION 311 (HARD INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST, NOMINAL NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3053 rpm; fundamental blade passage frequency, 1322 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | | |
|---|------------|-------|-------|-------|-------|-------|-------|------|------|------|------|----------------|-------------------------|------|------|------|-------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 | 160 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 77.3 | 80.8 | 81.4 | 82.3 | 84.1 | 83.1 | 85.4 | 77.9 | 80.9 | 76.9 | 78.8 | 80.3 | 81.3 | 81.3 | 83.3 | 84.0 | 81.8 | 129.2 |
| 63 | 72.6 | 74.1 | 72.9 | 77.6 | 80.9 | 79.2 | 82.4 | 76.4 | 78.7 | 75.1 | 77.1 | 78.8 | 80.2 | 81.4 | 82.9 | 83.8 | 79.5 | 126.9 |
| 80 | 74.4 | 73.9 | 72.1 | 76.8 | 80.6 | 78.9 | 82.1 | 76.1 | 78.1 | 75.8 | 77.6 | 80.4 | 81.8 | 83.1 | 84.9 | 85.7 | 80.2 | 127.6 |
| 100 | 84.3 | 84.8 | 85.3 | 81.6 | 83.8 | 81.6 | 82.3 | 78.6 | 80.3 | 79.0 | 81.0 | 83.2 | 85.0 | 85.8 | 86.1 | 86.9 | 83.1 | 130.5 |
| 125 | 80.1 | 80.6 | 78.3 | 80.0 | 81.3 | 80.8 | 82.5 | 79.3 | 80.5 | 80.8 | 82.0 | 83.4 | 83.6 | 85.0 | 85.8 | 85.5 | 82.2 | 129.6 |
| 160 | 82.5 | 82.6 | 80.6 | 82.5 | 83.0 | 82.1 | 83.8 | 79.5 | 81.1 | 81.3 | 81.8 | 82.9 | 84.3 | 84.6 | 84.1 | 83.5 | 82.6 | 130.0 |
| 200 | 84.1 | 85.3 | 81.5 | 78.6 | 80.8 | 79.8 | 79.6 | 77.0 | 77.8 | 77.5 | 78.5 | 80.2 | 81.8 | 82.5 | 82.8 | 81.8 | 80.4 | 127.8 |
| 250 | 82.8 | 83.0 | 80.3 | 80.0 | 81.5 | 79.7 | 79.7 | 78.3 | 80.2 | 80.3 | 81.2 | 83.1 | 83.3 | 83.8 | 83.2 | 81.9 | 81.4 | 128.8 |
| 315 | 82.8 | 82.6 | 80.6 | 80.3 | 80.3 | 80.3 | 80.3 | 79.0 | 80.3 | 80.1 | 81.3 | 82.6 | 83.0 | 83.5 | 82.0 | 81.0 | 81.2 | 128.6 |
| 400 | 83.8 | 83.7 | 82.3 | 81.7 | 81.7 | 79.5 | 79.0 | 78.0 | 80.3 | 80.8 | 82.7 | 82.9 | 84.2 | 84.3 | 82.3 | 80.7 | 81.9 | 129.3 |
| 500 | 84.9 | 84.8 | 84.3 | 83.8 | 83.3 | 81.3 | 79.1 | 78.4 | 79.9 | 80.6 | 82.1 | 83.0 | 83.8 | 84.3 | 82.1 | 80.1 | 82.3 | 129.7 |
| 630 | 85.9 | 85.9 | 85.1 | 84.6 | 82.9 | 80.1 | 79.1 | 78.2 | 79.4 | 80.2 | 81.6 | 82.3 | 83.1 | 83.2 | 81.2 | 79.1 | 82.1 | 129.5 |
| 800 | 88.5 | 88.2 | 86.8 | 86.2 | 85.0 | 81.8 | 80.3 | 79.3 | 80.2 | 80.2 | 81.5 | 81.9 | 83.5 | 83.5 | 81.3 | 79.5 | 83.2 | 130.6 |
| 1000 | 90.8 | 90.5 | 89.5 | 88.3 | 87.5 | 83.8 | 81.6 | 80.3 | 80.6 | 80.6 | 81.0 | 82.1 | 82.3 | 82.6 | 80.6 | 79.0 | 84.7 | 132.1 |
| 1250 | 100.2 | 99.9 | 102.2 | 100.7 | 101.0 | 97.4 | 93.0 | 90.5 | 88.9 | 86.7 | 87.7 | 86.5 | 87.9 | 87.2 | 86.5 | 86.6 | 95.9 | 143.3 |
| 1600 | 92.0 | 92.6 | 92.8 | 91.6 | 91.0 | 87.3 | 83.0 | 81.3 | 80.8 | 79.5 | 80.5 | 80.9 | 82.5 | 81.8 | 79.8 | 78.7 | 86.9 | 134.3 |
| 2000 | 89.9 | 91.0 | 90.2 | 89.2 | 87.2 | 83.4 | 79.4 | 77.7 | 78.2 | 77.7 | 78.7 | 79.5 | 81.4 | 80.7 | 78.4 | 76.4 | 84.4 | 131.8 |
| 2500 | 94.8 | 96.7 | 97.2 | 97.2 | 95.0 | 90.0 | 85.2 | 81.8 | 81.0 | 80.3 | 81.0 | 81.3 | 82.0 | 82.2 | 80.8 | 79.3 | 90.9 | 138.3 |
| 3150 | 90.6 | 92.2 | 92.4 | 91.2 | 88.9 | 86.6 | 79.4 | 77.1 | 77.2 | 76.9 | 78.1 | 79.5 | 80.9 | 80.1 | 77.9 | 75.7 | 86.0 | 133.4 |
| 4000 | 92.8 | 94.8 | 93.1 | 93.3 | 93.7 | 90.0 | 83.3 | 79.6 | 78.8 | 79.8 | 81.5 | 82.6 | 84.5 | 83.2 | 81.8 | 77.9 | 90.3 | 137.7 |
| 5000 | 91.1 | 93.1 | 93.4 | 94.6 | 94.6 | 92.3 | 87.8 | 80.4 | 77.4 | 78.1 | 77.1 | 80.1 | 80.8 | 82.6 | 82.8 | 79.6 | 75.1 | 136.1 |
| 6300 | 90.8 | 92.3 | 92.3 | 92.4 | 90.1 | 86.1 | 78.6 | 74.2 | 75.6 | 75.5 | 78.3 | 78.8 | 80.6 | 80.8 | 77.1 | 73.1 | 87.5 | 134.9 |
| 8000 | 91.4 | 92.9 | 92.4 | 91.7 | 89.9 | 87.3 | 77.9 | 74.2 | 75.9 | 77.3 | 79.1 | 80.0 | 82.1 | 80.2 | 77.9 | 74.0 | 88.3 | 135.7 |
| 10000 | 90.8 | 92.3 | 91.4 | 90.6 | 89.3 | 86.6 | 78.1 | 73.9 | 76.4 | 76.7 | 79.4 | 79.5 | 81.9 | 79.8 | 77.5 | 71.9 | 88.5 | 135.9 |
| 12500 | 89.2 | 90.6 | 90.1 | 89.3 | 88.1 | 86.1 | 76.4 | 74.3 | 75.8 | 78.0 | 80.0 | 80.3 | 82.8 | 78.9 | 78.5 | 72.8 | 88.9 | 136.3 |
| 16000 | 87.7 | 88.9 | 88.5 | 88.6 | 87.4 | 83.5 | 72.7 | 71.2 | 76.0 | 76.5 | 79.4 | 79.7 | 80.0 | 77.5 | 77.9 | 70.8 | 89.5 | 136.9 |
| 20000 | 86.0 | 87.2 | 87.4 | 86.9 | 86.4 | 80.2 | 71.0 | 67.9 | 72.9 | 73.6 | 75.9 | 76.8 | 77.7 | 76.2 | 74.2 | 68.0 | 90.1 | 137.5 |
| OVERALL | 104.8 | 105.6 | 106.4 | 105.7 | 104.7 | 101.2 | 97.3 | 94.4 | 94.6 | 93.9 | 95.3 | 96.0 | 97.3 | 97.2 | 96.4 | 95.7 | 101.8 | 149.2 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 90.3 | 100.1 | 104.6 | 107.0 | 107.2 | 104.7 | 101.2 | 98.9 | 98.9 | 98.3 | 99.3 | 99.4 | 99.7 | 97.3 | 93.1 | 87.2 | | |
| 113 METERS | 82.1 | 92.4 | 97.5 | 100.2 | 100.7 | 98.2 | 95.0 | 92.9 | 92.8 | 91.9 | 92.8 | 92.8 | 92.9 | 90.4 | 85.9 | 80.3 | | |

(b) Percent of design speed, 70; fan physical speed, 3562 rpm; fundamental blade passage frequency, 1543 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|--|--|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | | | |
| 50 | 81.5 | 79.1 | 80.1 | 80.6 | 81.6 | 82.1 | 83.6 | 81.6 | 83.6 | 81.6 | 84.0 | 85.4 | 86.5 | 86.3 | 87.5 | 88.5 | 84.0 | 131.4 | | |
| 63 | 86.8 | 84.1 | 83.1 | 87.3 | 82.8 | 84.6 | 83.8 | 83.1 | 82.6 | 81.4 | 83.6 | 84.3 | 87.3 | 86.6 | 87.8 | 89.1 | 84.9 | 132.3 | | |
| 80 | 78.6 | 79.0 | 78.3 | 77.6 | 80.3 | 80.3 | 82.6 | 80.5 | 81.8 | 80.8 | 83.8 | 85.7 | 88.6 | 89.0 | 90.6 | 91.9 | 85.0 | 132.4 | | |
| 100 | 80.3 | 79.8 | 79.6 | 79.6 | 81.1 | 81.3 | 82.8 | 82.1 | 83.5 | 84.0 | 86.6 | 88.4 | 90.5 | 91.3 | 92.6 | 93.0 | 86.9 | 134.3 | | |
| 125 | 86.3 | 83.7 | 83.2 | 86.3 | 83.8 | 84.0 | 84.5 | 84.0 | 86.3 | 86.5 | 87.7 | 89.1 | 90.8 | 91.5 | 92.5 | 91.7 | 87.8 | 135.2 | | |
| 160 | 83.3 | 84.0 | 84.5 | 83.3 | 84.0 | 83.7 | 84.7 | 84.0 | 85.7 | 85.5 | 86.3 | 87.9 | 88.2 | 89.0 | 89.5 | 88.9 | 86.2 | 133.6 | | |
| 200 | 84.3 | 84.6 | 83.8 | 82.3 | 82.0 | 82.1 | 82.3 | 81.8 | 82.5 | 82.5 | 84.1 | 85.9 | 87.6 | 88.5 | 89.1 | 88.2 | 84.8 | 132.2 | | |
| 250 | 87.8 | 88.8 | 88.0 | 85.8 | 85.6 | 86.3 | 82.3 | 83.0 | 87.3 | 86.1 | 87.1 | 88.5 | 89.6 | 89.8 | 89.5 | 87.3 | 87.2 | 134.6 | | |
| 315 | 85.3 | 85.7 | 85.8 | 84.3 | 83.8 | 83.3 | 83.7 | 83.5 | 85.7 | 85.0 | 86.2 | 87.6 | 88.2 | 88.8 | 88.0 | 85.9 | 85.9 | 133.3 | | |
| 400 | 88.2 | 88.0 | 87.2 | 85.9 | 85.7 | 84.4 | 83.7 | 82.7 | 86.2 | 88.2 | 87.2 | 88.6 | 89.2 | 88.9 | 88.4 | 87.4 | 87.1 | 134.5 | | |
| 500 | 88.3 | 89.1 | 90.8 | 90.4 | 90.4 | 86.9 | 85.8 | 86.3 | 85.8 | 86.9 | 88.1 | 90.0 | 89.6 | 88.3 | 87.6 | 84.5 | 88.4 | 135.8 | | |
| 630 | 91.3 | 92.0 | 95.6 | 93.3 | 94.3 | 90.5 | 87.6 | 84.1 | 89.5 | 87.0 | 89.1 | 90.6 | 90.6 | 90.1 | 88.3 | 85.0 | 90.7 | 138.1 | | |
| 800 | 92.0 | 91.5 | 91.1 | 91.5 | 90.8 | 89.0 | 86.5 | 84.5 | 85.3 | 85.8 | 86.3 | 88.2 | 88.3 | 88.8 | 86.8 | 84.3 | 88.4 | 135.8 | | |
| 1000 | 94.2 | 94.8 | 94.8 | 94.5 | 94.6 | 92.1 | 89.1 | 87.1 | 86.6 | 87.4 | 86.2 | 88.5 | 88.6 | 88.6 | 88.9 | 84.6 | 90.8 | 138.2 | | |
| 1250 | 94.9 | 96.6 | 97.3 | 97.4 | 96.8 | 93.1 | 90.3 | 87.9 | 87.6 | 86.8 | 86.6 | 87.5 | 88.4 | 88.6 | 88.8 | 84.5 | 92.4 | 139.8 | | |
| 1600 | 105.2 | 108.2 | 109.5 | 111.0 | 110.5 | 106.5 | 103.5 | 98.5 | 99.8 | 97.0 | 95.8 | 96.0 | 96.5 | 97.5 | 97.5 | 94.7 | 105.0 | 152.4 | | |
| 2000 | 94.9 | 96.2 | 96.4 | 96.5 | 96.0 | 93.5 | 88.9 | 85.0 | 85.4 | 84.4 | 85.0 | 85.6 | 87.2 | 86.5 | 84.5 | 82.3 | 91.6 | 139.0 | | |
| 2500 | 95.1 | 96.3 | 96.9 | 97.1 | 94.8 | 92.9 | 87.4 | 84.1 | 84.4 | 83.4 | 84.2 | 84.9 | 85.4 | 84.7 | 83.2 | 81.5 | 91.4 | 138.8 | | |
| 3150 | 102.6 | 102.6 | 104.3 | 103.4 | 102.3 | 99.9 | 93.3 | 89.4 | 87.6 | 87.1 | 87.3 | 88.1 | 88.9 | 88.1 | 86.4 | 85.2 | 98.2 | 145.6 | | |
| 4000 | 96.8 | 97.8 | 98.8 | 98.6 | 97.1 | 94.9 | 88.4 | 83.8 | 83.4 | 84.0 | 85.5 | 86.4 | 88.1 | 85.6 | 84.1 | 81.2 | 93.5 | 140.9 | | |
| 5000 | 98.3 | 99.4 | 100.4 | 101.6 | 99.9 | 96.9 | 89.9 | 84.8 | 84.6 | 84.1 | 86.6 | 87.4 | 89.1 | 87.8 | 85.6 | 81.6 | 96.0 | 143.4 | | |
| 6300 | 95.4 | 96.7 | 97.3 | 98.3 | 96.3 | 93.9 | 86.3 | 80.8 | 81.8 | 81.0 | 83.3 | 84.0 | 84.8 | 83.9 | 81.3 | 78.3 | 93.1 | 140.5 | | |
| 8000 | 94.9 | 96.7 | 97.1 | 96.4 | 94.9 | 93.7 | 84.6 | 79.7 | 80.5 | 81.5 | 83.8 | 84.2 | 86.0 | 83.1 | 81.2 | 78.1 | 93.0 | 140.4 | | |
| 10000 | 93.8 | 94.9 | 95.4 | 94.8 | 93.3 | 92.3 | 83.5 | 78.8 | 80.7 | 80.2 | 83.4 | 82.9 | 85.2 | 82.3 | 80.1 | 75.8 | 92.5 | 139.9 | | |
| 12500 | 91.2 | 93.4 | 93.4 | 92.4 | 91.8 | 90.4 | 81.2 | 78.6 | 79.6 | 81.5 | 83.9 | 84.0 | 86.0 | 80.9 | 80.7 | 76.0 | 92.3 | 139.7 | | |
| 16000 | 89.6 | 90.9 | 90.9 | 91.2 | 90.4 | 87.2 | 77.9 | 76.4 | 80.2 | 80.7 | 84.0 | 83.9 | 84.1 | 80.5 | 80.4 | 74.7 | 92.5 | 139.9 | | |
| 20000 | 88.0 | 89.3 | 89.5 | 89.3 | 87.2 | 83.8 | 76.0 | 73.3 | 77.8 | 78.6 | 80.5 | 80.4 | 81.9 | 79.3 | 77.9 | 71.6 | 92.9 | 140.3 | | |
| OVERALL | 109.7 | 111.4 | 112.5 | 113.3 | 112.5 | 109.2 | 105.3 | 101.3 | 102.4 | 101.0 | 101.3 | 102.3 | 103.3 | 103.3 | 103.1 | 101.7 | 108.3 | 155.7 | | |
| DISTANCE | | | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | | | |
| 1 METERS | 96.6 | 106.5 | 111.7 | 115.0 | 116.0 | 114.1 | 111.1 | 107.5 | 108.7 | 107.0 | 106.6 | 106.6 | 106.2 | 104.6 | 101.5 | 95.3 | | | | |

SIDE LINE PERCEIVED NOISE LEVELS

DISTANCE

61 METERS 96.6 106.5 111.7 115.0 116.0 114.1 111.1 107.5 108.7 107.0 106.6 106.6 106.2 104.6 101.5 95.3

TABLE XIII. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4087 rpm; fundamental blade passage frequency, 1782 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | | | | |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | | | 120 | 130 | 140 | 150 | 160 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 84.1 | 80.5 | 84.0 | 82.3 | 82.8 | 83.3 | 85.8 | 84.3 | 86.0 | 85.0 | 87.0 | 87.4 | 88.5 | 91.0 | 93.0 | 95.0 | 87.5 | 134.9 |
| 63 | 90.3 | 86.9 | 90.6 | 85.9 | 85.3 | 82.6 | 86.1 | 83.9 | 86.9 | 84.4 | 87.3 | 88.5 | 89.6 | 91.8 | 93.4 | 95.7 | 88.6 | 136.0 |
| 80 | 85.0 | 83.3 | 84.5 | 81.6 | 81.8 | 81.3 | 84.6 | 83.0 | 85.1 | 85.5 | 88.5 | 90.4 | 92.6 | 94.6 | 96.8 | 98.2 | 90.0 | 137.4 |
| 100 | 83.8 | 82.3 | 83.5 | 82.5 | 82.1 | 83.6 | 86.1 | 86.0 | 87.8 | 89.0 | 91.5 | 92.5 | 95.0 | 97.0 | 99.1 | 99.3 | 92.1 | 139.5 |
| 125 | 88.4 | 87.9 | 89.2 | 88.2 | 87.2 | 87.5 | 88.0 | 88.9 | 90.5 | 90.9 | 93.0 | 94.4 | 95.2 | 97.2 | 99.0 | 97.7 | 92.9 | 140.3 |
| 160 | 87.2 | 87.5 | 88.7 | 88.0 | 87.8 | 88.5 | 89.0 | 89.5 | 90.5 | 90.5 | 91.7 | 92.8 | 93.2 | 95.2 | 95.5 | 94.9 | 91.4 | 138.8 |
| 200 | 86.7 | 88.3 | 87.3 | 87.0 | 86.0 | 86.5 | 87.2 | 87.0 | 87.7 | 87.5 | 89.8 | 91.4 | 93.0 | 94.8 | 95.7 | 94.2 | 90.3 | 137.7 |
| 250 | 89.0 | 90.3 | 88.5 | 91.0 | 89.3 | 87.5 | 87.8 | 87.2 | 89.5 | 90.0 | 91.8 | 93.8 | 94.3 | 95.3 | 95.8 | 93.7 | 91.6 | 139.0 |
| 315 | 88.3 | 90.6 | 90.5 | 90.3 | 88.1 | 87.8 | 87.6 | 89.6 | 89.6 | 90.0 | 91.5 | 92.6 | 93.6 | 94.8 | 94.1 | 91.7 | 91.1 | 138.5 |
| 400 | 91.9 | 91.6 | 95.3 | 92.4 | 95.3 | 92.6 | 92.6 | 91.4 | 93.8 | 93.4 | 92.8 | 93.7 | 95.3 | 95.8 | 95.1 | 92.5 | 93.8 | 141.2 |
| 500 | 99.6 | 100.1 | 106.3 | 106.6 | 108.3 | 104.1 | 100.3 | 97.8 | 99.5 | 96.6 | 99.5 | 95.1 | 100.3 | 97.3 | 101.1 | 97.7 | 102.4 | 149.8 |
| 630 | 101.0 | 100.6 | 109.0 | 111.0 | 109.6 | 104.5 | 101.3 | 98.8 | 95.3 | 97.8 | 99.0 | 100.4 | 97.0 | 96.3 | 93.6 | 94.7 | 104.0 | 151.4 |
| 800 | 99.2 | 103.8 | 107.7 | 107.0 | 109.7 | 109.2 | 104.3 | 103.7 | 101.0 | 99.0 | 97.2 | 97.1 | 97.8 | 97.8 | 94.3 | 93.2 | 104.4 | 151.8 |
| 1000 | 102.6 | 104.8 | 105.8 | 107.9 | 113.8 | 110.8 | 105.4 | 99.8 | 98.4 | 97.4 | 97.6 | 99.4 | 97.6 | 98.8 | 95.8 | 95.7 | 106.0 | 153.4 |
| 1250 | 100.4 | 102.9 | 104.7 | 109.0 | 111.2 | 108.0 | 104.4 | 100.0 | 96.7 | 96.5 | 94.7 | 96.5 | 96.2 | 95.5 | 94.5 | 93.6 | 104.3 | 151.7 |
| 1600 | 108.0 | 110.0 | 112.0 | 112.0 | 112.7 | 109.0 | 106.7 | 102.9 | 98.7 | 97.5 | 97.9 | 98.1 | 98.5 | 96.7 | 95.4 | 96.1 | 107.0 | 154.4 |
| 2000 | 107.4 | 109.4 | 111.2 | 111.2 | 112.2 | 108.7 | 106.2 | 101.6 | 98.2 | 96.4 | 97.4 | 97.4 | 97.9 | 95.7 | 94.4 | 95.5 | 106.5 | 153.9 |
| 2500 | 101.9 | 103.4 | 104.7 | 106.2 | 106.9 | 104.4 | 98.9 | 94.7 | 93.4 | 91.4 | 91.7 | 91.7 | 91.9 | 91.9 | 90.2 | 88.6 | 101.1 | 148.5 |
| 3150 | 101.4 | 103.8 | 104.8 | 105.6 | 105.6 | 103.1 | 97.6 | 93.6 | 91.8 | 90.4 | 90.9 | 92.2 | 92.1 | 90.9 | 89.6 | 88.0 | 100.5 | 147.9 |
| 4000 | 102.1 | 104.0 | 104.8 | 106.0 | 106.0 | 103.8 | 97.5 | 92.8 | 90.8 | 90.3 | 91.0 | 92.1 | 92.6 | 90.8 | 89.5 | 87.9 | 101.0 | 148.4 |
| 5000 | 99.3 | 101.6 | 102.1 | 104.6 | 103.6 | 101.5 | 95.3 | 89.8 | 89.3 | 88.1 | 89.8 | 91.0 | 91.0 | 90.1 | 88.0 | 84.9 | 99.2 | 146.6 |
| 6300 | 97.7 | 99.5 | 100.0 | 101.6 | 100.9 | 98.8 | 92.3 | 86.8 | 86.8 | 85.5 | 87.5 | 88.0 | 88.3 | 87.4 | 85.6 | 81.9 | 97.0 | 144.4 |
| 8000 | 97.2 | 99.7 | 100.2 | 99.8 | 99.5 | 98.7 | 90.9 | 85.2 | 85.0 | 86.0 | 87.8 | 87.8 | 88.6 | 86.2 | 84.7 | 82.3 | 96.9 | 144.3 |
| 10000 | 95.4 | 97.6 | 97.6 | 97.7 | 97.9 | 96.9 | 89.3 | 83.8 | 84.3 | 83.6 | 86.8 | 86.7 | 87.8 | 85.4 | 83.1 | 79.2 | 96.0 | 143.4 |
| 12500 | 93.1 | 95.4 | 95.3 | 95.3 | 96.1 | 94.8 | 87.1 | 82.1 | 82.7 | 84.9 | 86.6 | 86.6 | 87.7 | 83.3 | 83.0 | 78.9 | 95.5 | 142.9 |
| 16000 | 90.7 | 92.7 | 93.1 | 93.9 | 94.2 | 91.9 | 83.4 | 79.9 | 83.4 | 83.7 | 87.0 | 87.1 | 86.7 | 83.4 | 82.9 | 77.0 | 95.6 | 143.0 |
| 20000 | 88.4 | 90.6 | 91.1 | 91.7 | 91.3 | 88.3 | 81.6 | 77.1 | 80.6 | 82.1 | 83.4 | 83.5 | 84.6 | 81.8 | 80.0 | 74.8 | 95.7 | 143.1 |
| OVERALL | 114.1 | 116.1 | 118.4 | 119.3 | 120.7 | 117.7 | 113.7 | 110.2 | 108.2 | 107.3 | 108.0 | 108.4 | 108.9 | 108.7 | 108.9 | 108.2 | 115.0 | 162.4 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 101.1 | 111.0 | 117.0 | 120.1 | 122.6 | 120.9 | 118.2 | 114.8 | 112.9 | 111.6 | 112.1 | 111.7 | 111.0 | 108.3 | 104.9 | 100.7 | | |

(d) Percent of design speed, 90; fan physical speed, 4575 rpm; fundamental blade passage frequency, 1982 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 86.1 | 83.3 | 85.6 | 85.6 | 86.8 | 87.1 | 89.0 | 87.1 | 88.8 | 89.1 | 90.5 | 91.7 | 93.5 | 95.0 | 97.5 | 100.2 | 91.7 | |
| 63 | 83.8 | 85.7 | 86.3 | 85.3 | 86.2 | 85.7 | 88.0 | 85.8 | 88.3 | 88.0 | 89.2 | 91.8 | 94.5 | 96.0 | 98.8 | 101.2 | 92.2 | |
| 80 | 90.1 | 90.4 | 91.9 | 89.9 | 88.8 | 87.1 | 87.9 | 87.6 | 89.6 | 89.5 | 92.3 | 94.9 | 97.2 | 99.5 | 102.1 | 104.3 | 95.2 | |
| 100 | 87.3 | 85.5 | 86.3 | 86.7 | 85.7 | 87.5 | 89.7 | 89.0 | 92.0 | 93.5 | 95.5 | 97.6 | 99.5 | 102.7 | 104.5 | 105.1 | 97.2 | |
| 125 | 91.7 | 89.5 | 89.7 | 90.5 | 90.7 | 91.5 | 92.5 | 92.0 | 94.7 | 95.0 | 97.2 | 98.6 | 100.2 | 102.3 | 104.2 | 103.0 | 97.5 | |
| 160 | 93.5 | 92.0 | 92.6 | 91.8 | 94.3 | 92.8 | 94.1 | 94.0 | 95.0 | 95.6 | 96.0 | 98.2 | 98.5 | 100.6 | 101.0 | 100.0 | 96.5 | |
| 200 | 92.5 | 93.8 | 92.8 | 98.7 | 96.7 | 95.0 | 93.5 | 92.0 | 92.0 | 92.2 | 94.2 | 96.1 | 98.5 | 100.5 | 101.2 | 99.2 | 96.3 | |
| 250 | 96.2 | 97.8 | 97.5 | 104.3 | 102.0 | 100.0 | 97.2 | 95.0 | 93.5 | 95.2 | 96.3 | 98.1 | 99.7 | 102.3 | 101.7 | 99.6 | 99.3 | |
| 315 | 99.8 | 99.5 | 105.7 | 103.3 | 100.2 | 98.7 | 97.5 | 98.5 | 98.8 | 97.2 | 97.3 | 98.4 | 100.2 | 100.5 | 100.5 | 97.4 | 99.9 | |
| 400 | 99.1 | 102.8 | 101.1 | 107.8 | 107.3 | 103.5 | 101.0 | 99.1 | 98.8 | 98.3 | 98.0 | 98.1 | 99.2 | 100.5 | 99.3 | 96.5 | 102.1 | |
| 500 | 104.3 | 109.8 | 113.3 | 113.6 | 111.9 | 108.9 | 109.9 | 107.8 | 106.4 | 106.3 | 106.8 | 101.7 | 102.4 | 103.4 | 102.1 | 101.5 | 108.7 | |
| 630 | 98.5 | 104.7 | 106.5 | 110.0 | 108.8 | 107.5 | 104.0 | 100.2 | 98.7 | 97.7 | 100.7 | 99.4 | 99.0 | 101.0 | 98.0 | 96.9 | 104.2 | |
| 800 | 106.1 | 107.2 | 110.1 | 111.2 | 113.9 | 110.6 | 109.2 | 103.7 | 104.6 | 101.2 | 99.9 | 100.1 | 99.6 | 102.6 | 99.9 | 96.6 | 107.6 | |
| 1000 | 103.8 | 103.1 | 105.9 | 111.8 | 110.7 | 105.6 | 101.6 | 101.2 | 99.7 | 100.1 | 98.4 | 98.8 | 99.1 | 99.2 | 98.6 | 94.8 | 104.7 | |
| 1250 | 104.5 | 105.6 | 106.6 | 108.9 | 109.9 | 105.5 | 103.5 | 100.8 | 99.8 | 97.9 | 97.3 | 97.9 | 99.1 | 98.6 | 97.3 | 94.7 | 104.0 | |
| 1600 | 102.6 | 104.4 | 104.9 | 106.6 | 107.4 | 105.1 | 100.1 | 96.9 | 96.2 | 95.1 | 95.9 | 96.8 | 97.5 | 96.7 | 95.6 | 92.5 | 101.9 | |
| 2000 | 107.1 | 109.1 | 109.8 | 111.6 | 109.9 | 107.8 | 102.4 | 98.3 | 98.4 | 96.8 | 97.4 | 98.2 | 99.3 | 97.6 | 96.4 | 94.2 | 105.4 | |
| 2500 | 103.6 | 105.7 | 106.3 | 107.7 | 106.9 | 104.1 | 99.9 | 95.8 | 94.9 | 93.8 | 94.4 | 95.4 | 95.4 | 95.4 | 93.8 | 91.5 | 102.1 | |
| 3150 | 102.1 | 104.1 | 104.9 | 105.4 | 104.6 | 102.2 | 98.1 | 94.1 | 93.2 | 92.7 | 93.9 | 94.2 | 94.3 | 93.7 | 92.4 | 90.3 | 100.4 | |
| 4000 | 102.0 | 103.5 | 104.3 | 105.3 | 104.7 | 102.3 | 98.0 | 93.0 | 92.8 | 93.5 | 95.0 | 95.7 | 96.3 | 93.7 | 92.5 | 89.8 | 100.6 | |
| 5000 | 99.5 | 101.5 | 102.1 | 104.3 | 103.8 | 100.8 | 95.6 | 91.1 | 91.8 | 90.8 | 93.0 | 93.5 | 93.9 | 93.0 | 91.5 | 87.8 | 99.4 | |
| 6300 | 98.0 | 99.5 | 100.3 | 101.6 | 101.4 | 98.1 | 93.1 | 88.1 | 89.1 | 88.8 | 90.8 | 90.8 | 90.7 | 90.6 | 89.2 | 85.1 | 97.4 | |
| 8000 | 97.3 | 99.4 | 100.1 | 100.1 | 99.9 | 98.4 | 92.3 | 87.1 | 88.1 | 89.1 | 91.0 | 90.7 | 92.0 | 89.3 | 88.3 | 84.9 | 97.4 | |
| 10000 | 95.4 | 97.2 | 97.7 | 98.2 | 98.6 | 97.1 | 91.2 | 85.7 | 87.1 | 87.1 | 89.6 | 88.8 | 90.4 | 87.7 | 86.7 | 84.0 | 96.7 | |
| 12500 | 92.4 | 94.4 | 95.4 | 96.1 | 96.8 | 95.6 | 88.7 | 84.8 | 85.6 | 87.4 | 89.6 | 89.0 | 89.9 | 84.9 | 85.3 | 81.8 | 96.4 | |
| 16000 | 89.8 | 92.2 | 92.5 | 94.7 | 95.3 | 92.6 | 85.5 | 82.7 | 86.3 | 86.8 | 90.3 | 89.8 | 89.2 | 84.8 | 85.1 | 80.1 | 96.8 | |
| 20000 | 87.4 | 89.7 | 91.3 | 92.6 | 92.7 | 89.5 | 84.6 | 80.4 | 84.9 | 85.4 | 87.5 | 87.1 | 87.5 | 84.5 | 83.2 | 78.0 | 97.3 | |
| OVERALL | 114.9 | 117.1 | 119.0 | 120.8 | 120.4 | 117.5 | 115.3 | 112.3 | 111.8 | 111.0 | 111.5 | 111.0 | 111.9 | 113.1 | 113.2 | 112.5 | 116.0 | |

SIDE LINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 101.9 | 111.8 | 117.0 | 121.3 | 122.1 | 120.9 | 117.8 | 115.4 | 115.0 | 114.4 | 114.7 | 113.8 | 113.5 | 111.6 | 108.3 | 102.6 |
| 305 METERS | 77.2 | 90.6 | 97.7 | 103.0 | 104.4 | 103.4 | 101.4 | 99.3 | 98.8 | 98.1 | 98.3 | 96.5 | 96.0 | 94.2 | 90.5 | 84.5 |

TABLE XIV. - NOISE OF FAN C CONFIGURATION 312 (HARD INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST, LARGE NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3032 rpm; fundamental blade passage frequency, 1313 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 77.1 | 79.4 | 77.1 | 81.9 | 79.9 | 77.4 | 83.4 | 76.4 | 81.1 | 76.6 | 77.9 | 76.4 | 78.1 | 78.9 | 80.1 | 81.5 | 79.5 | 126.9 |
| 63 | 69.1 | 71.9 | 69.6 | 72.1 | 71.4 | 71.6 | 73.1 | 74.9 | 74.4 | 73.1 | 74.9 | 74.9 | 78.1 | 78.6 | 81.1 | 81.7 | 75.6 | 123.0 |
| 80 | 71.9 | 71.6 | 69.9 | 71.4 | 70.6 | 70.9 | 72.1 | 74.9 | 73.9 | 73.4 | 76.4 | 76.9 | 80.1 | 81.6 | 82.6 | 84.5 | 77.1 | 124.5 |
| 100 | 85.4 | 85.9 | 84.9 | 83.4 | 82.7 | 78.2 | 78.2 | 76.2 | 77.2 | 77.2 | 79.7 | 81.4 | 84.2 | 85.2 | 84.4 | 85.8 | 82.0 | 129.4 |
| 125 | 76.9 | 78.1 | 76.4 | 75.9 | 76.4 | 75.6 | 76.6 | 77.4 | 77.9 | 78.9 | 80.6 | 80.9 | 81.9 | 82.6 | 83.9 | 83.7 | 79.6 | 127.0 |
| 160 | 83.9 | 83.7 | 79.4 | 78.7 | 80.7 | 81.4 | 81.4 | 82.9 | 78.7 | 80.4 | 81.4 | 81.9 | 80.9 | 83.4 | 84.2 | 82.8 | 81.6 | 129.0 |
| 200 | 84.2 | 87.2 | 81.2 | 76.7 | 79.9 | 75.9 | 74.7 | 75.7 | 75.7 | 76.7 | 78.2 | 77.7 | 79.7 | 80.7 | 81.2 | 80.5 | 79.2 | 126.6 |
| 250 | 80.2 | 80.7 | 78.2 | 77.9 | 77.2 | 76.4 | 76.4 | 76.4 | 77.4 | 79.2 | 79.7 | 80.5 | 81.2 | 81.9 | 80.9 | 80.1 | 79.1 | 126.5 |
| 315 | 83.7 | 81.4 | 79.4 | 79.2 | 78.4 | 77.9 | 77.2 | 76.9 | 77.9 | 78.4 | 79.4 | 80.2 | 81.4 | 81.2 | 80.2 | 78.8 | 79.2 | 126.6 |
| 400 | 81.4 | 82.4 | 80.9 | 79.6 | 81.1 | 77.4 | 76.1 | 76.1 | 77.6 | 79.6 | 81.4 | 80.9 | 82.6 | 81.9 | 80.4 | 78.7 | 80.1 | 127.5 |
| 500 | 83.3 | 83.1 | 81.3 | 81.1 | 80.8 | 78.8 | 78.1 | 77.3 | 77.6 | 78.6 | 80.3 | 80.6 | 81.8 | 81.8 | 80.1 | 78.7 | 80.2 | 127.6 |
| 630 | 84.6 | 84.4 | 82.6 | 81.6 | 80.1 | 78.1 | 77.1 | 76.4 | 77.6 | 78.3 | 79.6 | 79.9 | 81.6 | 81.1 | 79.1 | 77.5 | 80.0 | 127.4 |
| 800 | 87.5 | 87.2 | 87.0 | 85.2 | 84.7 | 81.7 | 79.7 | 79.2 | 78.5 | 79.2 | 79.7 | 80.2 | 81.2 | 81.5 | 79.7 | 78.4 | 82.3 | 129.7 |
| 1000 | 89.5 | 89.0 | 87.7 | 86.7 | 85.7 | 83.0 | 81.2 | 80.0 | 79.5 | 80.5 | 80.5 | 80.2 | 81.2 | 81.5 | 79.5 | 78.1 | 83.4 | 130.8 |
| 1250 | 99.8 | 99.8 | 101.0 | 97.8 | 100.3 | 95.5 | 91.3 | 87.8 | 87.8 | 85.0 | 86.5 | 85.3 | 88.5 | 87.8 | 86.8 | 84.7 | 94.6 | 142.0 |
| 1600 | 90.6 | 91.1 | 91.1 | 89.4 | 89.1 | 84.9 | 81.4 | 78.9 | 78.9 | 77.9 | 79.2 | 79.2 | 81.4 | 80.7 | 78.4 | 77.1 | 85.1 | 132.5 |
| 2000 | 88.5 | 90.0 | 88.8 | 87.8 | 85.5 | 82.0 | 78.0 | 76.8 | 77.0 | 77.0 | 78.0 | 78.0 | 80.5 | 79.8 | 77.0 | 75.2 | 83.1 | 130.5 |
| 2500 | 93.7 | 96.4 | 96.2 | 95.9 | 94.7 | 90.4 | 85.2 | 81.1 | 80.4 | 79.6 | 80.1 | 79.9 | 81.4 | 82.2 | 79.1 | 78.1 | 90.2 | 137.6 |
| 3150 | 89.1 | 90.6 | 90.4 | 89.6 | 87.4 | 83.4 | 78.3 | 75.3 | 75.4 | 75.6 | 77.1 | 77.9 | 79.6 | 79.6 | 76.6 | 74.1 | 84.4 | 131.8 |
| 4000 | 92.2 | 94.2 | 94.7 | 94.9 | 92.4 | 88.9 | 82.4 | 77.9 | 77.4 | 78.4 | 80.7 | 81.0 | 83.7 | 83.4 | 80.4 | 76.6 | 89.1 | 136.5 |
| 5000 | 90.2 | 92.2 | 92.2 | 93.5 | 91.0 | 87.2 | 79.7 | 75.7 | 76.0 | 76.0 | 78.7 | 80.1 | 82.2 | 80.7 | 78.0 | 73.9 | 87.6 | 135.0 |
| 6300 | 89.6 | 91.3 | 90.5 | 91.1 | 88.8 | 86.1 | 78.0 | 73.0 | 74.3 | 74.3 | 76.8 | 77.9 | 80.3 | 79.3 | 75.5 | 72.1 | 86.3 | 133.7 |
| 8000 | 89.8 | 92.3 | 91.0 | 90.4 | 88.5 | 87.0 | 77.5 | 72.8 | 74.6 | 76.3 | 78.8 | 79.2 | 81.8 | 80.8 | 77.1 | 72.9 | 87.3 | 134.7 |
| 10000 | 88.9 | 91.1 | 90.1 | 89.3 | 87.6 | 86.4 | 77.1 | 73.8 | 76.3 | 76.3 | 79.0 | 78.4 | 81.5 | 79.9 | 77.3 | 71.4 | 87.4 | 134.8 |
| 12500 | 87.9 | 89.9 | 88.9 | 87.6 | 87.1 | 85.9 | 76.3 | 74.1 | 74.9 | 77.6 | 80.1 | 79.8 | 82.9 | 80.1 | 78.8 | 73.0 | 88.1 | 135.5 |
| 16000 | 85.4 | 88.1 | 86.9 | 87.5 | 85.9 | 83.8 | 72.8 | 72.1 | 75.8 | 76.4 | 80.1 | 80.0 | 80.3 | 78.6 | 77.9 | 71.6 | 88.7 | 136.1 |
| 20000 | 84.0 | 85.9 | 86.0 | 86.0 | 83.0 | 80.2 | 70.7 | 68.7 | 73.3 | 74.2 | 76.2 | 76.5 | 78.2 | 76.0 | 74.2 | 68.8 | 89.2 | 136.6 |
| OVERALL | 103.9 | 105.0 | 105.0 | 103.8 | 103.7 | 99.9 | 95.4 | 92.9 | 93.0 | 92.7 | 94.2 | 94.3 | 96.3 | 96.1 | 95.1 | 94.2 | 100.6 | 148.0 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 89.5 | 99.5 | 103.3 | 105.5 | 106.2 | 103.8 | 99.9 | 97.4 | 97.4 | 97.1 | 98.3 | 97.7 | 98.7 | 96.6 | 91.7 | 85.6 | | |
| 113 METERS | 81.3 | 91.8 | 96.2 | 98.7 | 99.6 | 97.3 | 93.6 | 91.2 | 91.3 | 90.9 | 91.7 | 91.1 | 91.9 | 89.6 | 84.8 | 78.7 | | |

(b) Percent of design speed, 70; fan physical speed, 3537 rpm; fundamental blade passage frequency, 1532 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 78.3 | 74.8 | 78.5 | 79.5 | 77.8 | 78.0 | 78.8 | 79.5 | 81.3 | 80.8 | 81.8 | 81.3 | 82.0 | 84.3 | 86.5 | 87.4 | 81.5 | 128.9 |
| 63 | 84.0 | 78.5 | 84.2 | 87.2 | 80.5 | 81.7 | 84.0 | 84.2 | 81.5 | 82.0 | 83.5 | 82.0 | 84.0 | 84.7 | 87.7 | 88.6 | 84.0 | 131.4 |
| 80 | 74.5 | 76.0 | 75.0 | 74.0 | 75.0 | 75.8 | 75.5 | 76.5 | 79.0 | 79.0 | 82.3 | 83.3 | 85.5 | 87.5 | 89.8 | 91.2 | 83.0 | 130.4 |
| 100 | 77.3 | 76.8 | 77.3 | 78.3 | 77.0 | 78.5 | 78.5 | 79.3 | 81.8 | 83.0 | 84.8 | 86.3 | 88.3 | 89.8 | 91.0 | 91.9 | 85.1 | 132.5 |
| 125 | 82.0 | 80.8 | 82.8 | 86.5 | 82.8 | 82.5 | 82.0 | 82.3 | 84.8 | 85.5 | 86.3 | 88.0 | 89.0 | 89.5 | 90.8 | 90.2 | 86.3 | 133.7 |
| 160 | 80.8 | 82.5 | 81.8 | 81.8 | 82.0 | 81.8 | 82.3 | 83.3 | 83.5 | 84.3 | 84.8 | 85.3 | 86.0 | 86.8 | 87.5 | 87.7 | 84.3 | 131.7 |
| 200 | 82.0 | 83.3 | 81.0 | 81.5 | 80.8 | 80.3 | 80.0 | 80.5 | 81.8 | 82.8 | 83.5 | 85.5 | 87.3 | 87.8 | 86.9 | 83.2 | 83.2 | 130.6 |
| 250 | 85.0 | 87.8 | 85.5 | 86.0 | 82.3 | 84.3 | 81.3 | 81.5 | 83.5 | 84.8 | 85.0 | 86.3 | 87.0 | 87.5 | 87.8 | 86.4 | 85.2 | 132.6 |
| 315 | 83.5 | 85.3 | 83.3 | 83.5 | 81.3 | 80.8 | 81.8 | 82.8 | 83.5 | 84.5 | 84.8 | 85.3 | 86.0 | 87.0 | 86.0 | 84.7 | 84.2 | 131.6 |
| 400 | 86.5 | 87.0 | 86.0 | 87.3 | 84.8 | 83.5 | 83.3 | 84.5 | 84.0 | 86.5 | 86.5 | 86.3 | 87.5 | 87.3 | 86.8 | 84.6 | 85.9 | 133.3 |
| 500 | 89.0 | 89.8 | 91.0 | 91.5 | 91.0 | 85.3 | 86.5 | 85.0 | 88.3 | 89.3 | 89.3 | 88.0 | 89.5 | 89.3 | 86.3 | 83.9 | 88.8 | 136.2 |
| 630 | 92.0 | 93.5 | 92.5 | 91.3 | 94.0 | 90.8 | 88.0 | 85.0 | 89.7 | 86.7 | 88.7 | 86.8 | 90.5 | 88.0 | 86.5 | 84.1 | 89.9 | 137.3 |
| 800 | 91.8 | 92.1 | 92.3 | 92.8 | 91.3 | 89.1 | 87.3 | 85.1 | 84.3 | 85.6 | 85.3 | 87.9 | 86.6 | 88.1 | 85.1 | 83.2 | 88.6 | 136.0 |
| 1000 | 94.4 | 97.5 | 96.6 | 94.4 | 93.8 | 94.9 | 91.1 | 87.9 | 86.1 | 86.1 | 85.9 | 87.4 | 87.1 | 89.1 | 87.6 | 84.3 | 91.6 | 139.0 |
| 1250 | 94.1 | 97.1 | 96.1 | 96.6 | 95.6 | 93.4 | 89.4 | 89.1 | 86.4 | 87.6 | 86.4 | 86.1 | 87.4 | 86.1 | 85.9 | 84.0 | 91.8 | 139.2 |
| 1600 | 104.0 | 109.5 | 109.3 | 109.8 | 107.8 | 105.8 | 99.3 | 102.5 | 96.5 | 100.0 | 94.8 | 93.1 | 94.3 | 93.5 | 97.8 | 94.2 | 104.0 | 151.4 |
| 2000 | 94.3 | 96.3 | 96.1 | 95.3 | 96.3 | 95.1 | 88.8 | 86.1 | 84.8 | 84.6 | 84.8 | 84.4 | 86.8 | 84.6 | 83.6 | 81.2 | 91.6 | 139.0 |
| 2500 | 95.1 | 96.6 | 97.3 | 97.6 | 96.1 | 94.1 | 88.3 | 85.1 | 83.8 | 83.6 | 84.1 | 83.9 | 85.6 | 83.8 | 82.1 | 81.0 | 92.0 | 139.4 |
| 3150 | 101.8 | 103.0 | 103.8 | 103.3 | 101.3 | 99.5 | 93.0 | 88.5 | 86.3 | 86.0 | 87.0 | 88.1 | 89.0 | 88.5 | 86.3 | 84.5 | 97.8 | 145.2 |
| 4000 | 95.7 | 98.3 | 97.7 | 98.3 | 97.3 | 95.3 | 88.8 | 84.5 | 82.8 | 83.8 | 84.8 | 85.3 | 87.8 | 85.3 | 83.5 | 80.5 | 93.3 | 140.7 |
| 5000 | 96.9 | 99.6 | 98.9 | 100.4 | 98.9 | 96.1 | 89.1 | 84.9 | 83.6 | 83.6 | 85.6 | 86.5 | 88.1 | 86.1 | 84.6 | 81.1 | 95.0 | 142.4 |
| 6300 | 94.2 | 96.5 | 96.5 | 97.0 | 96.0 | 93.4 | 86.3 | 80.2 | 80.2 | 79.9 | 82.2 | 82.6 | 84.2 | 82.4 | 79.5 | 77.0 | 92.4 | 139.8 |
| 8000 | 94.3 | 96.3 | 96.0 | 96.0 | 94.8 | 93.5 | 85.0 | 79.5 | 79.4 | 81.2 | 83.5 | 83.8 | 86.0 | 84.0 | 80.5 | 77.4 | 92.6 | 140.0 |
| 10000 | 92.5 | 94.5 | 94.2 | 94.2 | 92.7 | 91.7 | 83.0 | 78.7 | 79.4 | 79.6 | 82.6 | 82.2 | 84.9 | 82.5 | 79.4 | 75.3 | 91.8 | 139.2 |
| 12500 | 90.3 | 92.8 | 92.5 | 92.5 | 91.0 | 90.3 | 82.0 | 78.5 | 79.0 | 81.7 | 83.7 | 83.7 | 86.5 | 82.6 | 80.5 | 76.1 | 92.0 | 139.4 |
| 16000 | 88.5 | 91.0 | 90.0 | 91.3 | 89.8 | 87.5 | 78.2 | 77.3 | 80.5 | 81.2 | 84.4 | 84.4 | 84.5 | 81.7 | 80.9 | 75.5 | 92.4 | 139.8 |
| 20000 | 86.4 | 88.5 | 88.4 | 89.1 | 86.9 | 83.9 | 76.4 | 74.4 | 78.4 | 79.6 | 80.9 | 81.5 | 82.9 | 79.6 | 78.2 | 72.5 | 92.7 | 140.1 |
| OVERALL | 108.8 | 112.2 | 112.1 | 112.4 | 110.7 | 108.8 | 103.0 | 103.8 | 100.4 | 102.3 | 100.6 | 100.5 | 101.9 | 101.5 | 102.3 | 100.8 | 107.6 | 155.0 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 95.5 | 107.3 | 111.2 | 114.1 | 114.3 | 113.6 | 108.8 | 109.7 | 106.5 | 108.3 | 105.8 | 104.5 | 104.7 | 102.3 | 101.1 | 94.5 | | |

TABLE XIV. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4042 rpm; fundamental blade passage frequency, 1751 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) | | |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|--|--|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | | | |
| 50 | 80.9 | 78.6 | 81.4 | 80.4 | 80.6 | 81.1 | 81.6 | 82.4 | 83.1 | 83.6 | 84.4 | 85.9 | 87.1 | 89.1 | 91.4 | 93.5 | 85.6 | 133.0 | | |
| 63 | 89.7 | 88.7 | 87.2 | 85.2 | 83.2 | 81.7 | 83.2 | 83.2 | 86.7 | 86.0 | 84.7 | 87.5 | 88.5 | 91.2 | 93.0 | 94.3 | 87.6 | 135.0 | | |
| 80 | 82.2 | 81.7 | 80.7 | 79.9 | 79.2 | 78.9 | 79.4 | 81.4 | 82.9 | 83.9 | 86.4 | 87.9 | 90.9 | 93.2 | 95.2 | 97.1 | 88.3 | 135.7 | | |
| 100 | 81.4 | 79.9 | 80.9 | 80.1 | 80.4 | 80.9 | 82.1 | 84.1 | 85.9 | 87.6 | 90.1 | 91.1 | 92.9 | 95.1 | 97.1 | 97.8 | 90.3 | 137.7 | | |
| 125 | 86.2 | 84.5 | 87.7 | 87.5 | 86.7 | 86.0 | 86.5 | 87.5 | 89.0 | 90.5 | 91.7 | 93.0 | 94.0 | 95.2 | 96.5 | 96.3 | 91.3 | 138.7 | | |
| 160 | 85.0 | 85.0 | 86.5 | 86.2 | 86.0 | 86.0 | 86.7 | 88.2 | 88.5 | 89.0 | 90.0 | 91.0 | 91.5 | 93.5 | 93.5 | 93.4 | 89.6 | 137.0 | | |
| 200 | 85.4 | 86.7 | 85.7 | 84.7 | 84.2 | 84.7 | 84.7 | 84.9 | 85.4 | 86.4 | 87.9 | 89.9 | 91.9 | 93.2 | 93.7 | 92.6 | 88.6 | 136.0 | | |
| 250 | 87.6 | 87.1 | 89.4 | 89.6 | 90.4 | 87.4 | 86.4 | 87.4 | 87.4 | 88.1 | 89.9 | 91.4 | 92.4 | 93.6 | 94.1 | 91.8 | 90.1 | 137.5 | | |
| 315 | 88.0 | 86.5 | 90.0 | 88.5 | 88.5 | 88.3 | 86.0 | 87.5 | 88.3 | 89.0 | 90.8 | 90.0 | 91.5 | 92.8 | 92.5 | 90.1 | 89.5 | 136.9 | | |
| 400 | 88.3 | 90.1 | 95.6 | 100.1 | 98.8 | 98.1 | 93.8 | 91.6 | 93.8 | 93.3 | 95.3 | 91.3 | 94.3 | 92.6 | 94.6 | 91.7 | 95.4 | 142.8 | | |
| 500 | 98.7 | 104.2 | 108.2 | 111.4 | 109.7 | 108.9 | 104.2 | 99.9 | 103.2 | 92.9 | 104.9 | 96.4 | 101.2 | 94.2 | 102.2 | 97.8 | 105.4 | 152.8 | | |
| 630 | 100.2 | 102.6 | 112.4 | 113.1 | 109.7 | 107.9 | 101.7 | 97.2 | 95.1 | 102.4 | 96.6 | 94.7 | 96.6 | 96.2 | 97.6 | 97.0 | 105.7 | 153.1 | | |
| 800 | 99.2 | 102.0 | 106.7 | 106.5 | 111.0 | 109.2 | 106.7 | 105.0 | 101.0 | 100.2 | 98.0 | 94.8 | 98.5 | 99.0 | 94.7 | 92.4 | 105.0 | 152.4 | | |
| 1000 | 105.3 | 105.3 | 107.8 | 109.1 | 113.8 | 111.3 | 104.8 | 101.6 | 99.6 | 99.8 | 94.8 | 97.1 | 98.3 | 97.5 | 94.8 | 96.2 | 106.4 | 153.8 | | |
| 1250 | 100.6 | 103.1 | 104.3 | 109.1 | 111.8 | 108.1 | 104.3 | 102.8 | 98.8 | 98.1 | 94.6 | 96.1 | 96.6 | 94.8 | 94.3 | 93.5 | 104.7 | 152.1 | | |
| 1600 | 107.4 | 108.7 | 109.2 | 110.4 | 111.4 | 109.4 | 104.4 | 101.2 | 96.9 | 97.4 | 98.7 | 95.2 | 98.4 | 95.9 | 94.9 | 94.6 | 105.7 | 153.1 | | |
| 2000 | 106.1 | 106.8 | 107.6 | 109.8 | 109.8 | 107.6 | 102.6 | 99.6 | 95.8 | 95.5 | 97.0 | 93.8 | 96.5 | 94.6 | 93.3 | 93.0 | 104.3 | 151.7 | | |
| 2500 | 101.7 | 102.9 | 103.2 | 106.2 | 106.2 | 103.9 | 98.7 | 95.2 | 93.2 | 91.2 | 91.2 | 91.0 | 91.7 | 90.4 | 89.2 | 87.8 | 100.6 | 148.0 | | |
| 3150 | 101.4 | 102.4 | 103.9 | 104.9 | 105.1 | 102.6 | 97.6 | 93.4 | 90.4 | 90.6 | 89.9 | 90.7 | 92.4 | 90.1 | 88.6 | 87.1 | 99.9 | 147.3 | | |
| 4000 | 101.2 | 102.7 | 103.7 | 104.9 | 104.9 | 102.9 | 96.9 | 91.9 | 89.7 | 89.4 | 90.4 | 90.2 | 92.7 | 89.4 | 88.2 | 86.1 | 100.0 | 147.4 | | |
| 5000 | 98.8 | 100.3 | 102.0 | 104.0 | 103.5 | 100.8 | 94.3 | 89.8 | 89.0 | 87.0 | 89.0 | 89.4 | 91.0 | 87.0 | 86.8 | 83.8 | 98.7 | 146.1 | | |
| 6300 | 97.4 | 98.9 | 99.4 | 100.9 | 100.7 | 97.9 | 92.0 | 86.7 | 85.7 | 85.1 | 86.9 | 86.7 | 87.4 | 85.1 | 83.7 | 81.0 | 96.4 | 143.8 | | |
| 8000 | 97.1 | 98.4 | 99.4 | 99.6 | 99.6 | 98.1 | 90.6 | 85.4 | 84.6 | 85.4 | 87.6 | 86.9 | 88.8 | 86.6 | 83.6 | 80.5 | 96.5 | 143.9 | | |
| 10000 | 95.2 | 96.4 | 97.2 | 97.7 | 97.2 | 96.4 | 88.9 | 83.4 | 83.7 | 83.5 | 86.2 | 85.4 | 88.0 | 84.7 | 82.5 | 78.3 | 95.5 | 142.9 | | |
| 12500 | 92.6 | 94.4 | 95.1 | 95.1 | 96.2 | 94.4 | 87.4 | 82.7 | 82.8 | 84.9 | 87.6 | 86.6 | 88.6 | 84.4 | 82.8 | 78.6 | 95.4 | 142.8 | | |
| 16000 | 90.1 | 92.1 | 92.6 | 94.1 | 94.6 | 91.9 | 86.1 | 80.9 | 84.6 | 84.9 | 88.1 | 87.6 | 88.1 | 84.1 | 83.3 | 77.8 | 95.9 | 143.3 | | |
| 20000 | 87.7 | 89.7 | 91.0 | 91.7 | 91.5 | 88.3 | 82.0 | 79.0 | 82.5 | 83.8 | 85.3 | 85.3 | 86.0 | 83.0 | 81.0 | 76.0 | 96.1 | 143.5 | | |
| OVERALL | 113.8 | 115.2 | 118.0 | 119.7 | 120.4 | 118.3 | 113.4 | 110.7 | 108.8 | 108.3 | 108.9 | 106.3 | 108.6 | 107.5 | 108.3 | 107.4 | 115.0 | 162.4 | | |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | | |
| 61 METERS | 100.2 | 109.5 | 115.1 | 119.5 | 121.6 | 120.6 | 116.5 | 114.0 | 111.8 | 111.3 | 111.9 | 109.2 | 110.3 | 107.0 | 104.7 | 99.2 | | | | |

SIDELINE PERCEIVED NOISE LEVELS

| DISTANCE | 61 METERS | 100.2 | 109.5 | 115.1 | 119.5 | 121.6 | 120.6 | 116.5 | 114.0 | 111.8 | 111.3 | 111.9 | 109.2 | 110.3 | 107.0 | 104.7 | 99.2 |
|----------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|----------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|

(d) Percent of design speed, 90; fan physical speed, 4547 rpm; fundamental blade passage frequency, 1970 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 85.5 | 82.0 | 84.5 | 84.2 | 84.5 | 84.7 | 85.5 | 86.0 | 86.0 | 87.5 | 88.0 | 90.0 | 91.7 | 93.7 | 96.7 | 99.1 | 90.2 | 137.6 |
| 63 | 84.5 | 85.5 | 84.2 | 83.5 | 84.0 | 84.0 | 83.7 | 85.0 | 85.5 | 86.5 | 88.2 | 89.7 | 92.5 | 95.2 | 97.7 | 99.6 | 90.7 | 138.1 |
| 80 | 85.2 | 90.0 | 90.0 | 89.2 | 87.5 | 85.2 | 83.7 | 89.2 | 88.7 | 89.0 | 92.0 | 93.2 | 96.2 | 98.2 | 101.2 | 103.4 | 94.2 | 141.6 |
| 100 | 85.4 | 84.4 | 84.4 | 83.9 | 84.4 | 86.2 | 87.2 | 88.2 | 90.2 | 92.4 | 94.4 | 95.7 | 98.7 | 100.9 | 102.4 | 103.6 | 95.6 | 143.0 |
| 125 | 89.7 | 87.5 | 88.2 | 88.0 | 89.0 | 89.7 | 90.7 | 91.0 | 93.0 | 94.5 | 95.5 | 96.7 | 99.0 | 100.4 | 101.9 | 101.6 | 95.8 | 143.2 |
| 160 | 92.5 | 91.0 | 91.2 | 89.5 | 93.5 | 92.0 | 92.5 | 93.0 | 94.7 | 94.5 | 94.5 | 96.0 | 97.2 | 99.2 | 99.7 | 97.6 | 95.1 | 142.5 |
| 200 | 90.5 | 92.5 | 92.0 | 97.0 | 95.2 | 95.0 | 93.2 | 91.2 | 90.2 | 90.7 | 92.7 | 94.0 | 97.0 | 98.7 | 99.5 | 96.8 | 94.8 | 142.2 |
| 250 | 94.3 | 95.8 | 97.5 | 101.8 | 99.3 | 98.8 | 96.8 | 94.5 | 92.8 | 93.8 | 95.3 | 96.3 | 98.3 | 100.0 | 99.5 | 96.9 | 97.5 | 144.9 |
| 315 | 101.8 | 100.5 | 108.3 | 106.0 | 101.3 | 98.5 | 99.0 | 100.0 | 99.0 | 97.3 | 98.3 | 99.3 | 100.5 | 98.3 | 98.3 | 96.7 | 101.1 | 148.5 |
| 400 | 95.9 | 103.4 | 100.7 | 109.4 | 110.7 | 104.4 | 104.2 | 100.9 | 100.4 | 100.2 | 96.7 | 95.9 | 99.2 | 98.7 | 97.4 | 97.0 | 103.8 | 151.2 |
| 500 | 100.4 | 108.4 | 112.4 | 113.2 | 112.4 | 108.4 | 110.7 | 108.9 | 107.4 | 108.4 | 100.9 | 105.7 | 101.2 | 104.4 | 98.9 | 100.8 | 108.8 | 156.2 |
| 630 | 98.8 | 103.5 | 106.5 | 110.3 | 111.0 | 108.5 | 106.0 | 101.3 | 98.3 | 99.3 | 97.8 | 100.0 | 97.5 | 99.8 | 100.0 | 96.4 | 105.1 | 152.5 |
| 800 | 104.3 | 106.3 | 109.3 | 111.3 | 114.3 | 109.0 | 108.5 | 102.5 | 104.0 | 102.8 | 99.0 | 100.1 | 100.5 | 100.3 | 99.0 | 96.4 | 107.3 | 154.7 |
| 1000 | 103.3 | 102.1 | 104.3 | 111.3 | 111.3 | 105.1 | 98.3 | 101.3 | 99.1 | 97.6 | 97.1 | 97.1 | 97.3 | 97.3 | 97.3 | 94.2 | 104.3 | 151.7 |
| 1250 | 101.8 | 105.8 | 105.8 | 108.3 | 108.0 | 103.1 | 103.1 | 101.3 | 99.8 | 96.1 | 95.6 | 96.8 | 98.6 | 98.1 | 94.6 | 93.4 | 102.9 | 150.3 |
| 1600 | 102.5 | 102.5 | 103.7 | 105.5 | 106.5 | 102.5 | 98.5 | 96.2 | 94.5 | 94.0 | 94.7 | 94.8 | 95.2 | 94.5 | 93.7 | 90.9 | 100.5 | 147.9 |
| 2000 | 105.1 | 106.6 | 107.1 | 110.6 | 107.4 | 105.9 | 100.6 | 97.9 | 96.4 | 97.4 | 96.1 | 96.2 | 97.9 | 95.4 | 94.4 | 92.1 | 103.6 | 151.0 |
| 2500 | 101.7 | 104.2 | 104.7 | 106.5 | 106.7 | 102.0 | 98.0 | 95.2 | 94.2 | 92.7 | 93.2 | 93.5 | 94.0 | 92.7 | 92.0 | 89.9 | 100.9 | 148.3 |
| 3150 | 99.7 | 102.4 | 103.7 | 104.4 | 104.4 | 101.5 | 97.4 | 93.9 | 91.7 | 91.2 | 92.2 | 92.5 | 92.7 | 92.0 | 90.2 | 88.4 | 99.5 | 146.9 |
| 4000 | 100.0 | 102.7 | 103.2 | 104.2 | 104.2 | 101.2 | 96.5 | 93.2 | 91.5 | 92.0 | 93.5 | 94.5 | 95.0 | 92.7 | 90.5 | 88.2 | 99.6 | 147.0 |
| 5000 | 97.9 | 99.9 | 101.4 | 103.9 | 102.6 | 98.9 | 94.4 | 90.4 | 90.1 | 89.9 | 92.1 | 92.5 | 92.9 | 89.6 | 89.4 | 86.1 | 98.3 | 145.7 |
| 6300 | 97.2 | 98.2 | 98.9 | 101.2 | 101.0 | 97.2 | 91.7 | 87.7 | 87.9 | 87.7 | 89.9 | 89.6 | 89.9 | 87.9 | 86.7 | 83.2 | 96.6 | 144.0 |
| 8000 | 96.7 | 97.9 | 98.7 | 99.4 | 99.4 | 96.8 | 91.2 | 86.9 | 87.2 | 88.2 | 90.1 | 89.6 | 91.1 | 88.8 | 86.7 | 84.0 | 96.4 | 143.8 |
| 10000 | 95.2 | 96.2 | 96.4 | 97.4 | 98.0 | 96.0 | 89.2 | 86.0 | 86.5 | 86.0 | 88.7 | 87.9 | 90.0 | 86.7 | 84.5 | 81.3 | 95.8 | 143.2 |
| 12500 | 94.0 | 93.4 | 94.4 | 95.2 | 97.0 | 93.7 | 87.9 | 85.5 | 85.9 | 87.4 | 89.4 | 88.9 | 90.4 | 85.5 | 84.4 | 80.9 | 95.9 | 143.3 |
| 16000 | 92.6 | 90.7 | 91.2 | 93.9 | 95.7 | 90.9 | 84.9 | 83.9 | 87.4 | 87.6 | 90.6 | 90.1 | 89.9 | 85.6 | 85.1 | 80.3 | 96.7 | 144.1 |
| 20000 | 91.3 | 88.3 | 89.5 | 92.0 | 92.9 | 87.6 | 83.6 | 82.0 | 85.8 | 86.8 | 87.9 | 87.8 | 88.8 | 85.1 | 83.3 | 78.6 | 97.3 | 144.7 |
| OVERALL | 113.4 | 115.9 | 118.1 | 120.5 | 120.7 | 116.5 | 115.4 | 112.8 | 111.8 | 111.8 | 109.2 | 110.9 | 111.0 | 111.8 | 111.5 | 111.3 | 115.6 | 163.0 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| 61 METERS | 100.2 | 110.2 | 115.4 | 120.6 | 121.5 | 119.5 | 117.6 | 115.8 | 114.8 | 114.9 | 112.6 | 113.1 | 112.3 | 110.2 | 106.4 | 101.4 | | |
| 305 METERS | 75.2 | 89.2 | 96.8 | 102.3 | 103.9 | 102.0 | 101.3 | 99.7 | 98.7 | 98.8 | 95.5 | 96.6 | 94.8 | 93.4 | 88.5 | 83.4 | | |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 100.2 | 110.2 | 115.4 | 120.6 | 121.5 | 119.5 | 117.6 | 115.8 | 114.8 | 114.9 | 112.6 | 113.1 | 112.3 | 110.2 | 106.4 | 101.4 |
| 305 METERS | 75.2 | 89.2 | 96.8 | 102.3 | 103.9 | 102.0 | 101.3 | 99.7 | 98.7 | 98.8 | 95.5 | 96.6 | 94.8 | 93.4 | 88.5 | 83.4 |

TABLE XV. -- NOISE OF FAN C CONFIGURATION 313 (HARD INLET, FULLY TREATED FAN FRAME, SUPPRESSED EXHAUST, SMALL

NOZZLE) TEST PURPOSE - FAR-FIELD NOISE

[Data adjusted to standard day of 15° C and 70 percent relative humidity; SPL re 0.00002 N/sq m; PWL re 0.1 picowatt.]

(a) Percent of design speed, 60; fan physical speed, 3044 rpm; fundamental blade passage frequency, 1319 hertz.

| FREQUENCY | ANGLE, 1° DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | | |
| 50 | 82.0 | 83.0 | 81.7 | 84.3 | 84.0 | 84.8 | 84.2 | 80.8 | 84.2 | 80.5 | 79.5 | 79.2 | 80.3 | 82.0 | 82.3 | 84.2 | 82.6 | 130.0 |
| 63 | 80.1 | 78.3 | 76.3 | 76.4 | 76.1 | 80.8 | 79.1 | 79.3 | 82.4 | 77.6 | 77.3 | 78.4 | 80.3 | 81.9 | 83.1 | 84.2 | 79.9 | 127.3 |
| 80 | 80.3 | 79.0 | 76.0 | 76.1 | 74.3 | 79.8 | 79.6 | 79.0 | 82.6 | 79.0 | 78.5 | 80.2 | 82.0 | 84.3 | 85.3 | 87.2 | 81.0 | 128.4 |
| 100 | 87.5 | 87.7 | 86.5 | 85.5 | 83.0 | 82.0 | 81.7 | 81.2 | 83.2 | 81.2 | 81.8 | 84.4 | 86.0 | 87.7 | 87.2 | 87.9 | 84.5 | 131.9 |
| 125 | 84.7 | 84.8 | 84.5 | 83.5 | 81.5 | 82.3 | 82.0 | 81.5 | 83.3 | 83.0 | 83.5 | 84.9 | 85.3 | 86.8 | 87.0 | 87.6 | 84.1 | 131.5 |
| 160 | 86.7 | 86.2 | 85.7 | 86.2 | 83.5 | 82.5 | 84.5 | 84.2 | 83.4 | 83.7 | 84.2 | 84.6 | 86.7 | 86.9 | 86.2 | 85.7 | 84.9 | 132.3 |
| 200 | 86.8 | 88.5 | 85.5 | 81.6 | 80.1 | 81.1 | 79.5 | 79.6 | 79.8 | 79.0 | 80.1 | 81.2 | 82.6 | 84.3 | 84.1 | 83.7 | 82.2 | 129.6 |
| 250 | 87.0 | 87.3 | 86.0 | 84.7 | 82.7 | 82.7 | 81.0 | 81.5 | 82.8 | 82.7 | 83.5 | 84.8 | 86.3 | 86.3 | 85.0 | 83.2 | 84.1 | 131.5 |
| 315 | 86.8 | 86.8 | 85.8 | 85.2 | 82.8 | 82.3 | 82.0 | 82.5 | 82.5 | 82.5 | 83.3 | 84.4 | 85.5 | 85.5 | 84.0 | 82.9 | 83.9 | 131.3 |
| 400 | 87.4 | 87.7 | 87.1 | 85.9 | 83.9 | 82.1 | 80.7 | 81.1 | 82.4 | 83.1 | 84.6 | 85.1 | 86.6 | 86.2 | 84.2 | 82.6 | 84.5 | 131.9 |
| 500 | 88.2 | 88.1 | 87.7 | 87.4 | 85.4 | 82.9 | 81.2 | 81.2 | 81.4 | 82.7 | 83.6 | 84.7 | 85.9 | 85.7 | 83.4 | 82.0 | 84.6 | 132.0 |
| 630 | 89.0 | 88.7 | 88.7 | 88.2 | 85.5 | 82.5 | 80.7 | 81.0 | 81.0 | 81.8 | 83.0 | 84.2 | 85.0 | 85.0 | 82.5 | 80.9 | 84.5 | 131.9 |
| 800 | 91.0 | 90.5 | 89.7 | 89.3 | 86.8 | 83.8 | 82.0 | 81.2 | 81.2 | 81.7 | 82.2 | 83.3 | 85.0 | 84.8 | 82.0 | 81.0 | 85.2 | 132.6 |
| 1000 | 92.6 | 92.6 | 92.8 | 91.1 | 89.1 | 85.6 | 83.3 | 81.5 | 81.3 | 81.5 | 81.8 | 82.6 | 83.8 | 83.6 | 81.8 | 80.3 | 86.7 | 134.1 |
| 1250 | 101.3 | 100.6 | 104.5 | 102.0 | 104.3 | 100.0 | 93.3 | 92.5 | 89.8 | 88.3 | 87.8 | 88.1 | 89.3 | 88.8 | 87.8 | 87.4 | 98.0 | 145.4 |
| 1600 | 93.9 | 95.1 | 95.7 | 94.1 | 93.6 | 89.4 | 84.6 | 82.7 | 81.6 | 81.1 | 81.2 | 82.2 | 83.9 | 82.9 | 81.1 | 80.0 | 89.2 | 136.6 |
| 2000 | 92.0 | 93.5 | 93.1 | 91.8 | 89.1 | 85.0 | 81.3 | 79.3 | 79.4 | 79.1 | 80.4 | 80.7 | 82.6 | 81.4 | 79.6 | 77.9 | 86.6 | 134.0 |
| 2500 | 95.7 | 97.2 | 97.6 | 97.7 | 95.9 | 91.1 | 85.9 | 83.4 | 82.7 | 82.1 | 82.2 | 82.0 | 83.6 | 82.9 | 81.6 | 81.0 | 91.6 | 139.0 |
| 3150 | 92.7 | 94.1 | 94.7 | 93.1 | 90.2 | 86.1 | 81.1 | 78.2 | 78.2 | 78.4 | 78.9 | 80.9 | 82.1 | 81.4 | 78.9 | 77.8 | 87.8 | 135.2 |
| 4000 | 94.6 | 95.8 | 97.0 | 97.0 | 94.5 | 90.5 | 83.8 | 80.6 | 80.1 | 81.1 | 82.0 | 83.4 | 85.3 | 84.1 | 81.6 | 80.1 | 91.1 | 138.5 |
| 5000 | 93.3 | 94.5 | 95.0 | 95.5 | 93.3 | 89.0 | 81.8 | 78.3 | 79.2 | 79.0 | 80.8 | 82.1 | 84.0 | 82.7 | 80.7 | 77.4 | 89.9 | 137.3 |
| 6300 | 92.8 | 93.8 | 93.5 | 93.6 | 91.5 | 88.0 | 80.0 | 76.1 | 77.5 | 77.5 | 79.5 | 80.1 | 82.0 | 81.3 | 78.6 | 75.6 | 88.9 | 136.3 |
| 8000 | 93.1 | 94.4 | 93.8 | 93.0 | 91.3 | 88.4 | 79.9 | 75.8 | 77.6 | 78.6 | 80.4 | 81.1 | 83.6 | 82.3 | 78.6 | 76.1 | 89.7 | 137.1 |
| 10000 | 92.5 | 93.7 | 93.0 | 91.8 | 90.5 | 87.8 | 79.0 | 75.3 | 77.7 | 77.8 | 79.9 | 80.3 | 82.9 | 80.8 | 78.2 | 73.7 | 89.8 | 137.2 |
| 12500 | 90.9 | 91.7 | 91.6 | 90.2 | 89.2 | 86.7 | 77.7 | 75.6 | 76.6 | 79.3 | 80.6 | 81.2 | 83.8 | 80.6 | 77.8 | 74.3 | 90.0 | 137.4 |
| 16000 | 89.0 | 90.0 | 89.3 | 89.6 | 87.8 | 83.8 | 73.6 | 72.3 | 75.8 | 76.8 | 79.5 | 79.9 | 80.6 | 78.5 | 77.0 | 71.6 | 90.2 | 137.6 |
| 20000 | 87.0 | 87.7 | 88.1 | 87.4 | 84.8 | 79.7 | 70.9 | 67.9 | 72.1 | 73.1 | 74.9 | 75.8 | 77.4 | 75.1 | 73.9 | 67.5 | 90.4 | 137.8 |
| OVERALL | 106.5 | 107.0 | 108.3 | 107.0 | 106.9 | 103.1 | 97.8 | 96.6 | 96.4 | 95.7 | 96.4 | 97.3 | 98.8 | 98.7 | 97.5 | 97.1 | 103.3 | 150.7 |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 92.2 | 101.6 | 106.2 | 108.4 | 108.9 | 106.4 | 102.0 | 101.0 | 100.5 | 100.0 | 100.3 | 100.5 | 101.0 | 98.5 | 93.9 | 88.8 | | |
| 113 METERS | 84.0 | 93.9 | 99.4 | 101.6 | 102.5 | 100.2 | 95.8 | 94.9 | 94.3 | 93.8 | 93.8 | 93.9 | 94.2 | 91.6 | 87.0 | 81.7 | | |

(b) Percent of design speed, 70; fan physical speed, 3551 rpm; fundamental blade passage frequency, 1538 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 85.2 | 80.7 | 80.2 | 81.2 | 80.1 | 82.4 | 81.1 | 80.4 | 81.6 | 83.6 | 82.7 | 83.3 | 85.6 | 86.1 | 88.1 | 90.3 | 83.7 | 131.1 |
| 63 | 88.0 | 82.7 | 84.7 | 88.0 | 81.8 | 84.8 | 82.3 | 83.5 | 81.5 | 83.5 | 82.8 | 83.6 | 85.7 | 87.3 | 89.2 | 90.4 | 85.1 | 132.5 |
| 80 | 82.0 | 80.5 | 78.2 | 77.0 | 76.9 | 78.9 | 78.7 | 78.5 | 81.2 | 82.5 | 83.9 | 85.3 | 88.0 | 89.9 | 91.9 | 93.3 | 85.3 | 132.7 |
| 100 | 83.4 | 82.4 | 81.9 | 81.2 | 80.4 | 81.7 | 82.2 | 82.4 | 84.2 | 85.9 | 87.5 | 89.0 | 90.9 | 92.4 | 94.0 | 94.6 | 87.9 | 135.3 |
| 125 | 87.3 | 86.8 | 86.8 | 89.3 | 86.8 | 87.8 | 86.8 | 85.5 | 87.7 | 88.8 | 89.7 | 91.1 | 92.7 | 92.7 | 93.7 | 93.0 | 89.7 | 137.1 |
| 160 | 85.4 | 86.4 | 86.2 | 85.0 | 84.7 | 85.0 | 85.4 | 85.2 | 86.4 | 86.7 | 87.5 | 88.6 | 89.4 | 90.2 | 90.7 | 90.9 | 87.4 | 134.8 |
| 200 | 85.8 | 86.5 | 86.3 | 83.5 | 83.3 | 83.5 | 82.8 | 82.3 | 83.5 | 84.0 | 85.5 | 86.8 | 89.0 | 90.0 | 90.2 | 89.4 | 86.1 | 133.5 |
| 250 | 89.3 | 90.0 | 92.3 | 87.7 | 87.7 | 88.0 | 85.8 | 85.2 | 88.5 | 88.7 | 89.5 | 90.2 | 91.8 | 91.8 | 91.8 | 89.9 | 89.4 | 136.8 |
| 315 | 87.6 | 88.4 | 87.7 | 87.1 | 85.7 | 84.9 | 85.4 | 85.6 | 85.9 | 87.4 | 87.6 | 88.5 | 89.7 | 90.2 | 89.7 | 87.4 | 87.5 | 134.9 |
| 400 | 90.1 | 89.9 | 89.1 | 87.8 | 87.4 | 85.4 | 85.1 | 84.8 | 86.1 | 88.3 | 88.8 | 89.8 | 90.9 | 90.6 | 89.8 | 88.1 | 88.4 | 135.8 |
| 500 | 90.2 | 91.2 | 91.9 | 90.7 | 89.1 | 87.1 | 84.7 | 85.9 | 86.4 | 86.9 | 89.2 | 89.7 | 90.4 | 90.7 | 88.6 | 86.5 | 88.9 | 136.3 |
| 630 | 92.4 | 93.9 | 94.7 | 93.5 | 92.5 | 88.9 | 87.4 | 85.4 | 88.4 | 87.4 | 89.2 | 89.9 | 90.9 | 90.9 | 89.0 | 86.7 | 90.4 | 137.8 |
| 800 | 94.1 | 93.1 | 93.1 | 92.5 | 91.1 | 89.0 | 86.3 | 85.8 | 86.1 | 86.8 | 87.3 | 88.7 | 90.0 | 89.5 | 87.6 | 86.0 | 89.4 | 136.8 |
| 1000 | 95.0 | 95.1 | 94.9 | 95.2 | 95.1 | 90.6 | 88.4 | 87.8 | 86.0 | 86.8 | 87.5 | 88.4 | 89.8 | 88.5 | 87.2 | 85.7 | 91.0 | 138.4 |
| 1250 | 96.2 | 97.9 | 98.5 | 98.7 | 97.4 | 93.7 | 91.2 | 88.7 | 87.0 | 87.7 | 87.2 | 87.6 | 89.5 | 88.7 | 87.5 | 86.3 | 93.3 | 140.7 |
| 1600 | 106.9 | 108.1 | 110.1 | 112.4 | 111.3 | 106.8 | 103.9 | 98.1 | 97.9 | 99.1 | 95.4 | 95.0 | 95.6 | 97.1 | 98.1 | 97.2 | 105.7 | 153.1 |
| 2000 | 95.1 | 97.0 | 96.8 | 97.1 | 95.3 | 92.5 | 88.5 | 85.3 | 85.1 | 85.6 | 85.8 | 86.1 | 88.1 | 86.6 | 85.8 | 83.7 | 91.7 | 139.1 |
| 2500 | 95.5 | 96.7 | 97.2 | 97.4 | 95.2 | 92.5 | 87.4 | 84.5 | 84.2 | 84.2 | 85.4 | 85.5 | 86.9 | 85.5 | 84.5 | 82.3 | 91.7 | 139.1 |
| 3150 | 102.4 | 103.3 | 103.8 | 104.1 | 102.3 | 100.1 | 93.7 | 90.2 | 87.6 | 88.1 | 88.4 | 88.9 | 89.8 | 88.9 | 88.2 | 86.7 | 98.4 | 145.8 |
| 4000 | 97.5 | 99.2 | 99.0 | 99.3 | 97.2 | 95.0 | 88.3 | 84.8 | 84.0 | 85.2 | 86.3 | 87.3 | 88.8 | 87.0 | 85.2 | 83.1 | 94.0 | 141.4 |
| 5000 | 99.0 | 101.1 | 100.8 | 102.7 | 100.3 | 97.7 | 90.5 | 86.0 | 85.5 | 86.3 | 87.3 | 88.3 | 90.1 | 88.0 | 86.5 | 83.6 | 96.8 | 144.2 |
| 6300 | 96.5 | 97.8 | 98.0 | 99.3 | 97.0 | 94.8 | 87.1 | 82.1 | 82.5 | 82.8 | 84.2 | 84.8 | 86.0 | 84.5 | 83.0 | 80.3 | 94.0 | 141.4 |
| 8000 | 95.7 | 97.7 | 97.7 | 97.9 | 95.5 | 94.0 | 85.7 | 80.5 | 81.5 | 83.0 | 85.0 | 85.0 | 87.3 | 85.1 | 82.4 | 79.6 | 93.9 | 141.3 |
| 10000 | 94.5 | 96.2 | 96.0 | 96.2 | 93.8 | 92.3 | 84.0 | 79.4 | 81.4 | 81.8 | 84.4 | 83.9 | 86.1 | 83.4 | 81.2 | 76.9 | 93.3 | 140.7 |
| 12500 | 92.6 | 93.8 | 93.8 | 93.6 | 91.8 | 90.5 | 82.1 | 79.0 | 80.7 | 83.1 | 84.5 | 84.6 | 87.2 | 82.8 | 80.5 | 76.9 | 92.9 | 140.3 |
| 16000 | 90.2 | 91.4 | 91.1 | 92.3 | 90.2 | 86.9 | 77.9 | 76.4 | 80.3 | 82.1 | 84.1 | 84.0 | 84.6 | 81.3 | 80.2 | 75.0 | 92.8 | 140.2 |
| 20000 | 87.6 | 89.1 | 89.2 | 90.1 | 87.0 | 82.9 | 75.0 | 72.3 | 76.6 | 79.1 | 79.9 | 80.2 | 81.8 | 78.5 | 77.3 | 71.5 | 92.8 | 140.2 |
| OVERALL | 110.7 | 112.0 | 113.0 | 114.5 | 113.1 | 109.4 | 105.7 | 101.5 | 101.6 | 102.6 | 102.0 | 102.6 | 103.9 | 104.0 | 104.1 | 103.5 | 109.0 | 156.4 |
| DISTANCE | | | | | | | | | | | | | | | | | | |
| SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | | |
| 61 METERS | 98.0 | 107.1 | 112.3 | 116.2 | 116.5 | 114.3 | 111.4 | 107.7 | 107.8 | 108.7 | 107.1 | 106.5 | 106.5 | 105.0 | 102.5 | 97.3 | | |

TABLE XV. - Concluded.

(c) Percent of design speed, 80; fan physical speed, 4058 rpm; fundamental blade passage frequency, 1758 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | | |
| 50 | 95.1 | 81.9 | 83.6 | 83.6 | 85.9 | 83.2 | 84.4 | 84.4 | 84.9 | 86.7 | 87.1 | 88.3 | 89.4 | 91.9 | 93.6 | 96.1 | 88.2 | 135.6 |
| 63 | 90.2 | 90.1 | 89.7 | 86.6 | 85.9 | 82.2 | 83.9 | 83.2 | 86.9 | 87.1 | 88.4 | 89.7 | 90.2 | 93.4 | 94.7 | 95.6 | 89.3 | 136.7 |
| 80 | 85.1 | 84.9 | 83.9 | 81.9 | 83.9 | 81.4 | 81.6 | 82.6 | 85.3 | 86.4 | 88.8 | 90.7 | 93.1 | 96.3 | 98.1 | 99.6 | 91.0 | 138.4 |
| 100 | 86.3 | 85.5 | 85.0 | 84.1 | 85.1 | 85.0 | 85.1 | 86.8 | 88.8 | 90.3 | 92.6 | 93.7 | 95.8 | 97.8 | 100.1 | 100.3 | 93.1 | 140.5 |
| 125 | 89.8 | 89.3 | 88.9 | 89.4 | 90.4 | 88.8 | 89.8 | 90.1 | 91.4 | 92.6 | 94.3 | 94.9 | 96.6 | 98.1 | 99.9 | 98.7 | 94.0 | 141.4 |
| 160 | 89.4 | 90.1 | 89.7 | 89.4 | 89.4 | 89.4 | 89.4 | 90.4 | 91.6 | 91.9 | 93.1 | 93.8 | 94.6 | 96.2 | 96.6 | 96.5 | 92.6 | 140.0 |
| 200 | 89.6 | 91.4 | 88.9 | 87.4 | 87.1 | 86.6 | 87.1 | 87.4 | 87.9 | 89.1 | 90.8 | 91.8 | 94.8 | 96.3 | 96.8 | 95.1 | 91.4 | 138.8 |
| 250 | 92.3 | 91.6 | 91.5 | 91.1 | 91.3 | 89.0 | 89.6 | 90.1 | 91.5 | 93.3 | 94.6 | 95.9 | 96.1 | 97.8 | 97.0 | 95.9 | 93.7 | 141.1 |
| 315 | 90.8 | 91.0 | 91.1 | 90.3 | 89.8 | 89.0 | 89.3 | 90.3 | 90.8 | 91.6 | 92.5 | 93.7 | 95.0 | 96.0 | 94.8 | 92.8 | 92.2 | 139.6 |
| 400 | 92.5 | 91.9 | 92.9 | 90.7 | 93.9 | 90.7 | 90.4 | 90.4 | 91.0 | 92.2 | 93.4 | 94.5 | 96.0 | 95.7 | 94.7 | 92.6 | 93.1 | 140.5 |
| 500 | 98.5 | 97.5 | 101.2 | 97.7 | 104.2 | 99.2 | 97.3 | 96.7 | 97.3 | 97.5 | 98.3 | 96.3 | 98.2 | 96.3 | 97.8 | 95.7 | 98.8 | 146.2 |
| 630 | 100.7 | 100.2 | 105.4 | 105.4 | 105.1 | 101.4 | 96.6 | 96.6 | 94.9 | 97.9 | 99.6 | 98.8 | 96.7 | 95.9 | 95.2 | 93.6 | 100.5 | 147.9 |
| 800 | 100.0 | 102.0 | 106.2 | 103.2 | 107.7 | 107.2 | 102.7 | 101.5 | 97.5 | 98.2 | 97.7 | 96.1 | 97.9 | 97.7 | 95.0 | 94.6 | 102.5 | 149.9 |
| 1000 | 104.4 | 103.4 | 104.4 | 109.4 | 110.4 | 109.9 | 106.1 | 101.8 | 98.3 | 98.3 | 97.6 | 99.5 | 97.3 | 99.9 | 97.9 | 95.8 | 105.0 | 152.4 |
| 1250 | 100.4 | 101.5 | 102.0 | 105.4 | 109.7 | 106.7 | 102.2 | 98.5 | 97.7 | 95.9 | 95.7 | 95.8 | 95.9 | 96.2 | 93.7 | 91.8 | 102.6 | 150.0 |
| 1600 | 110.2 | 111.2 | 113.5 | 112.8 | 116.7 | 112.8 | 106.8 | 103.0 | 100.3 | 100.2 | 99.0 | 98.1 | 99.2 | 98.5 | 97.8 | 96.9 | 109.4 | 156.8 |
| 2000 | 108.9 | 110.0 | 111.7 | 111.1 | 115.0 | 111.4 | 105.2 | 101.4 | 98.9 | 98.2 | 97.7 | 96.5 | 97.7 | 97.1 | 96.7 | 95.5 | 107.9 | 155.3 |
| 2500 | 101.4 | 103.1 | 104.2 | 105.6 | 106.7 | 104.2 | 98.1 | 95.1 | 93.1 | 92.1 | 92.2 | 92.0 | 92.9 | 91.4 | 90.7 | 89.1 | 100.8 | 148.2 |
| 3150 | 103.2 | 104.5 | 106.0 | 106.5 | 106.7 | 105.0 | 99.0 | 94.7 | 93.0 | 92.0 | 92.2 | 92.6 | 92.7 | 91.8 | 90.5 | 89.9 | 101.7 | 149.1 |
| 4000 | 103.0 | 104.3 | 105.0 | 106.0 | 106.2 | 104.8 | 97.8 | 93.5 | 91.7 | 91.5 | 92.0 | 92.3 | 93.2 | 91.7 | 90.2 | 89.1 | 101.4 | 148.8 |
| 5000 | 101.1 | 102.4 | 103.6 | 105.3 | 104.9 | 102.6 | 95.9 | 91.8 | 91.1 | 90.1 | 91.6 | 91.9 | 92.4 | 90.1 | 89.6 | 87.1 | 100.3 | 147.7 |
| 6300 | 99.5 | 100.3 | 101.0 | 102.6 | 101.9 | 100.0 | 92.7 | 88.1 | 87.9 | 86.9 | 88.9 | 88.6 | 89.1 | 87.8 | 86.9 | 84.1 | 98.0 | 145.4 |
| 8000 | 99.1 | 100.6 | 101.1 | 100.9 | 101.0 | 100.0 | 92.0 | 86.8 | 86.5 | 87.1 | 88.7 | 88.4 | 90.1 | 88.2 | 86.3 | 84.2 | 98.1 | 145.5 |
| 10000 | 97.3 | 98.3 | 98.8 | 98.8 | 98.5 | 98.2 | 89.8 | 85.3 | 85.7 | 85.2 | 87.4 | 87.1 | 89.2 | 86.5 | 84.8 | 81.1 | 97.0 | 144.4 |
| 12500 | 95.0 | 96.1 | 97.0 | 96.3 | 97.2 | 96.3 | 87.8 | 83.8 | 84.2 | 85.9 | 87.7 | 87.3 | 89.2 | 84.6 | 82.8 | 79.8 | 96.7 | 144.1 |
| 16000 | 92.1 | 93.4 | 93.6 | 95.0 | 95.8 | 93.4 | 83.7 | 80.7 | 84.1 | 84.6 | 87.0 | 86.7 | 87.1 | 83.5 | 82.4 | 77.9 | 96.6 | 144.0 |
| 20000 | 89.6 | 91.0 | 92.0 | 93.1 | 92.7 | 90.2 | 81.2 | 77.0 | 81.0 | 81.9 | 83.2 | 84.0 | 84.6 | 81.1 | 80.0 | 74.6 | 96.7 | 144.1 |
| OVERALL | 115.5 | 116.4 | 118.3 | 118.5 | 121.2 | 118.4 | 113.1 | 109.9 | 108.0 | 108.2 | 108.5 | 108.5 | 109.1 | 109.6 | 109.5 | 108.8 | 115.2 | 162.6 |
| DISTANCE | SIDELINE PERCEIVED NOISE LEVELS | | | | | | | | | | | | | | | | | |
| 61 METERS | 102.4 | 111.4 | 117.1 | 119.6 | 124.0 | 122.3 | 117.6 | 114.8 | 113.3 | 112.9 | 112.7 | 111.6 | 111.3 | 109.3 | 106.3 | 101.1 | | |

DISTANCE

SIDELINE PERCEIVED NOISE LEVELS

61 METERS 102.4 111.4 117.1 119.6 124.0 122.3 117.6 114.8 113.3 112.9 112.7 111.6 111.3 109.3 106.3 101.1

(d) Percent of design speed, 90; fan physical speed, 4566 rpm; fundamental blade passage frequency, 1978 hertz.

| FREQUENCY | ANGLE, DEG | | | | | | | | | | | | | | AVERAGE SPL | POWER LEVEL (PWL) |
|---|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 |
| 1/3-OCTAVE BAND SOUND PRESSURE LEVEL (SPL) ON 30.5-METER RADIUS | | | | | | | | | | | | | | | | |
| 50 | 89.7 | 85.0 | 86.3 | 87.2 | 87.2 | 88.0 | 88.3 | 88.5 | 89.8 | 90.2 | 91.3 | 92.9 | 93.7 | 96.3 | 99.5 | 101.5 |
| 63 | 87.9 | 86.8 | 85.8 | 86.3 | 86.1 | 87.1 | 86.9 | 87.1 | 88.1 | 88.4 | 91.3 | 92.7 | 95.1 | 97.8 | 100.4 | 101.7 |
| 80 | 89.6 | 90.8 | 91.3 | 90.3 | 90.4 | 88.1 | 87.4 | 90.1 | 91.4 | 92.1 | 93.9 | 95.9 | 98.3 | 101.1 | 103.8 | 105.7 |
| 100 | 90.9 | 89.1 | 89.3 | 88.6 | 87.8 | 89.4 | 89.9 | 91.3 | 92.6 | 94.9 | 97.1 | 99.2 | 100.9 | 104.1 | 105.9 | 106.2 |
| 125 | 94.7 | 93.0 | 92.8 | 92.2 | 92.0 | 93.3 | 93.3 | 94.2 | 96.0 | 97.2 | 98.8 | 100.4 | 101.5 | 102.2 | 105.7 | 104.2 |
| 160 | 94.8 | 94.8 | 94.6 | 93.0 | 93.6 | 94.1 | 95.0 | 95.8 | 96.8 | 97.5 | 97.8 | 100.0 | 100.3 | 102.1 | 102.6 | 101.8 |
| 200 | 94.0 | 94.7 | 93.5 | 93.7 | 92.5 | 92.3 | 92.3 | 92.5 | 92.8 | 94.0 | 95.5 | 97.9 | 100.0 | 101.8 | 102.2 | 100.4 |
| 250 | 96.7 | 96.3 | 97.0 | 97.5 | 96.2 | 95.0 | 94.0 | 93.8 | 95.3 | 96.5 | 98.3 | 100.1 | 101.7 | 103.2 | 102.5 | 100.6 |
| 315 | 101.0 | 100.2 | 107.2 | 105.7 | 102.4 | 98.2 | 98.4 | 98.9 | 98.7 | 98.0 | 98.7 | 100.8 | 102.0 | 101.9 | 101.2 | 98.9 |
| 400 | 98.9 | 101.4 | 98.6 | 106.7 | 107.6 | 103.1 | 101.1 | 102.7 | 99.6 | 100.4 | 98.2 | 99.2 | 100.6 | 101.4 | 100.6 | 98.3 |
| 500 | 103.1 | 107.5 | 112.5 | 111.1 | 108.3 | 105.3 | 107.8 | 106.5 | 104.8 | 105.0 | 104.6 | 120.2 | 103.8 | 102.6 | 101.1 | 100.0 |
| 630 | 98.8 | 100.8 | 104.6 | 108.9 | 106.6 | 107.4 | 104.1 | 101.6 | 98.9 | 98.8 | 98.9 | 99.0 | 100.8 | 101.6 | 99.8 | 97.3 |
| 800 | 103.6 | 106.5 | 110.0 | 110.3 | 111.1 | 109.0 | 108.1 | 102.3 | 102.3 | 100.6 | 98.8 | 100.2 | 101.1 | 102.3 | 101.0 | 99.7 |
| 1000 | 103.8 | 104.7 | 105.8 | 110.7 | 110.2 | 106.7 | 103.5 | 99.5 | 99.3 | 99.0 | 99.0 | 99.3 | 100.2 | 100.2 | 99.3 | 96.6 |
| 1250 | 104.6 | 106.3 | 107.1 | 109.0 | 109.3 | 105.6 | 103.1 | 99.6 | 98.0 | 98.1 | 98.3 | 98.6 | 99.5 | 99.6 | 98.5 | 95.9 |
| 1600 | 103.7 | 105.7 | 106.1 | 107.4 | 108.1 | 105.1 | 102.4 | 97.9 | 97.4 | 97.1 | 97.2 | 97.8 | 98.4 | 97.4 | 96.6 | 94.3 |
| 2000 | 109.1 | 110.8 | 111.4 | 113.1 | 111.6 | 108.9 | 103.9 | 99.8 | 99.6 | 98.1 | 98.8 | 99.2 | 100.1 | 98.3 | 98.4 | 96.2 |
| 2500 | 104.0 | 106.3 | 106.3 | 108.5 | 107.5 | 104.0 | 100.2 | 96.0 | 95.8 | 94.8 | 95.5 | 96.3 | 96.7 | 95.7 | 95.0 | 92.6 |
| 3150 | 102.6 | 104.1 | 104.9 | 106.6 | 105.4 | 102.9 | 95.4 | 94.8 | 94.4 | 93.9 | 94.6 | 95.1 | 95.6 | 94.8 | 93.6 | 91.7 |
| 4000 | 103.1 | 104.6 | 105.4 | 106.6 | 105.4 | 103.2 | 98.7 | 94.1 | 93.4 | 94.4 | 95.1 | 96.2 | 96.6 | 94.6 | 93.2 | 91.5 |
| 5000 | 100.3 | 102.3 | 103.1 | 105.4 | 103.8 | 101.1 | 96.9 | 92.3 | 93.1 | 92.4 | 94.1 | 94.7 | 94.9 | 92.8 | 92.9 | 89.5 |
| 6300 | 99.2 | 100.6 | 100.9 | 102.8 | 101.3 | 99.1 | 94.0 | 89.5 | 90.6 | 89.9 | 91.6 | 92.0 | 92.2 | 91.6 | 90.5 | 86.9 |
| 8000 | 98.0 | 99.8 | 100.5 | 101.2 | 100.3 | 99.1 | 93.2 | 88.5 | 89.3 | 90.0 | 91.4 | 91.0 | 92.8 | 91.5 | 89.3 | 86.9 |
| 10000 | 96.3 | 97.8 | 98.3 | 99.3 | 98.7 | 97.7 | 91.7 | 87.2 | 88.5 | 87.8 | 90.0 | 90.4 | 91.9 | 89.2 | 87.5 | 84.6 |
| 12500 | 94.1 | 95.9 | 96.6 | 97.3 | 97.3 | 96.1 | 89.7 | 85.9 | 86.4 | 88.2 | 89.3 | 89.1 | 91.0 | 87.1 | 85.1 | 83.3 |
| 16000 | 90.6 | 92.6 | 93.6 | 96.4 | 96.0 | 93.1 | 85.5 | 83.3 | 86.1 | 86.7 | 89.0 | 88.9 | 88.8 | 85.8 | 84.1 | 81.3 |
| 20000 | 87.6 | 89.8 | 91.4 | 94.7 | 92.8 | 89.6 | 83.9 | 79.6 | 83.3 | 83.6 | 85.1 | 84.7 | 86.4 | 83.9 | 81.7 | 78.8 |
| OVERALL | 115.4 | 117.2 | 119.1 | 120.5 | 119.6 | 117.1 | 114.9 | 112.2 | 111.3 | 111.2 | 111.5 | 111.8 | 113.2 | 114.0 | 114.3 | 113.7 |

SIDELINE PERCEIVED NOISE LEVELS

DISTANCE

| | | | | | | | | | | | | | | | | |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 61 METERS | 103.1 | 112.7 | 117.8 | 122.0 | 122.6 | 121.3 | 118.5 | 115.6 | 115.5 | 114.8 | 115.0 | 114.7 | 114.6 | 112.4 | 109.6 | 103.9 |
| 305 METERS | 77.2 | 91.3 | 98.4 | 103.5 | 104.7 | 103.7 | 101.4 | 99.1 | 98.6 | 98.3 | 98.0 | 97.5 | 97.1 | 94.6 | 91.3 | 85.0 |

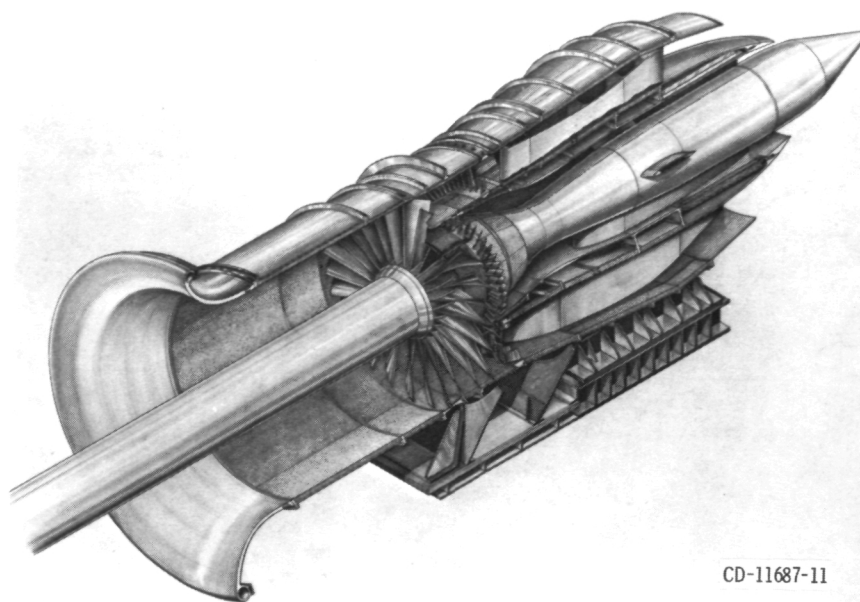


Figure 1. - Cutaway view of one configuration of fan test assembly.

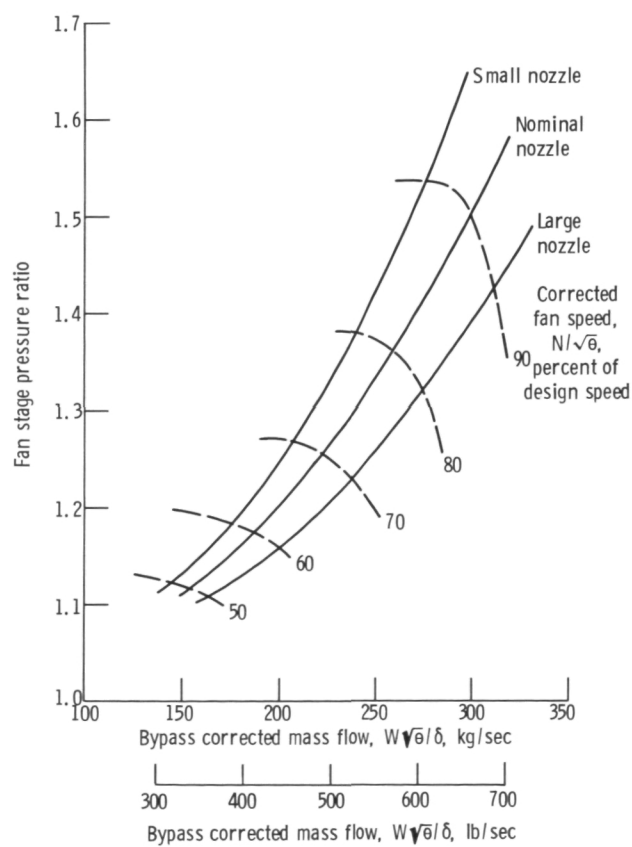


Figure 2. - Fan C performance map for acoustical tests.

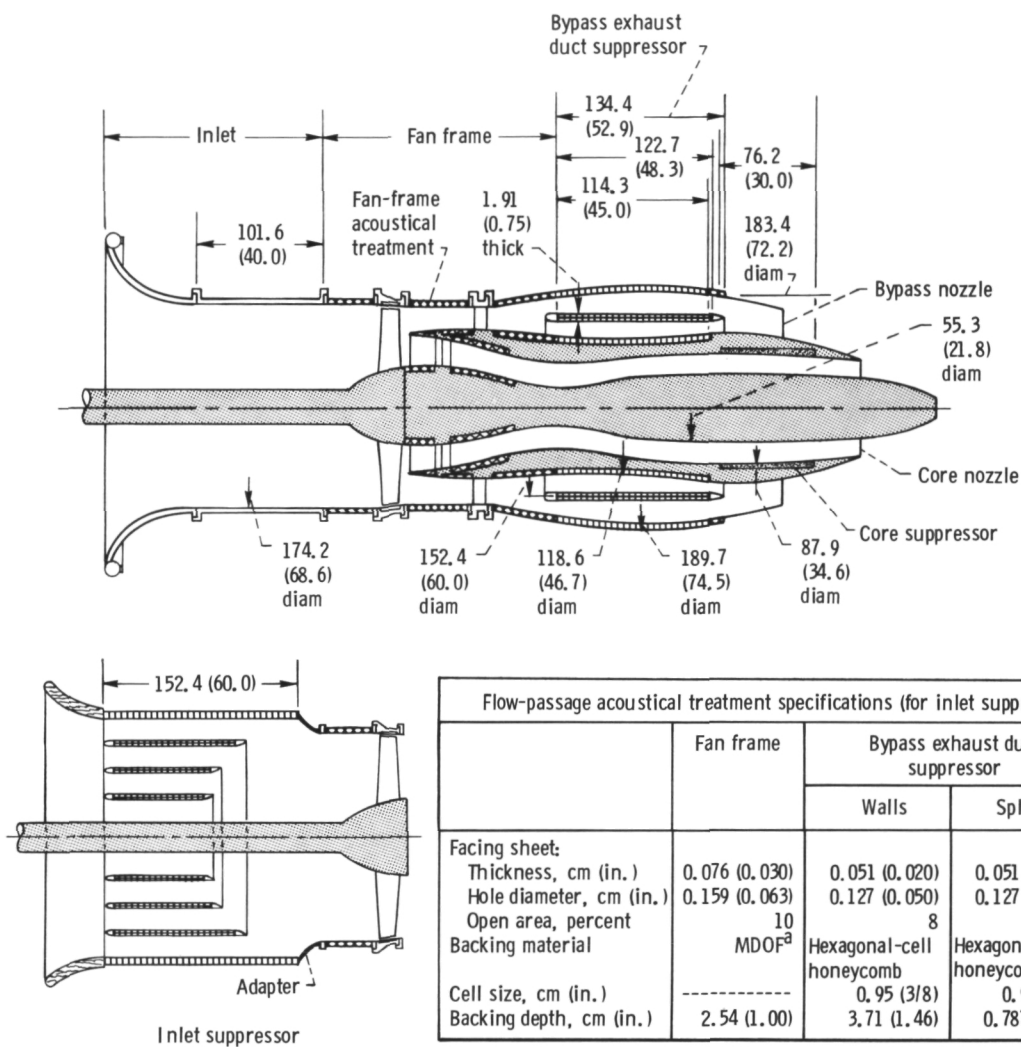
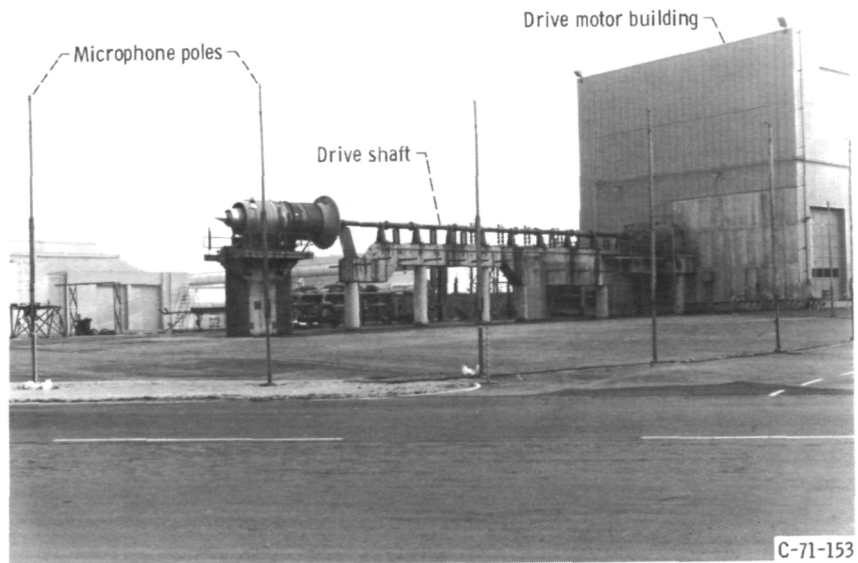


Figure 3. - Cross sections of hardware for acoustical testing. All dimensions are in centimeters (in.).



C-71-153

Figure 4. - Full-scale fan noise test facility.

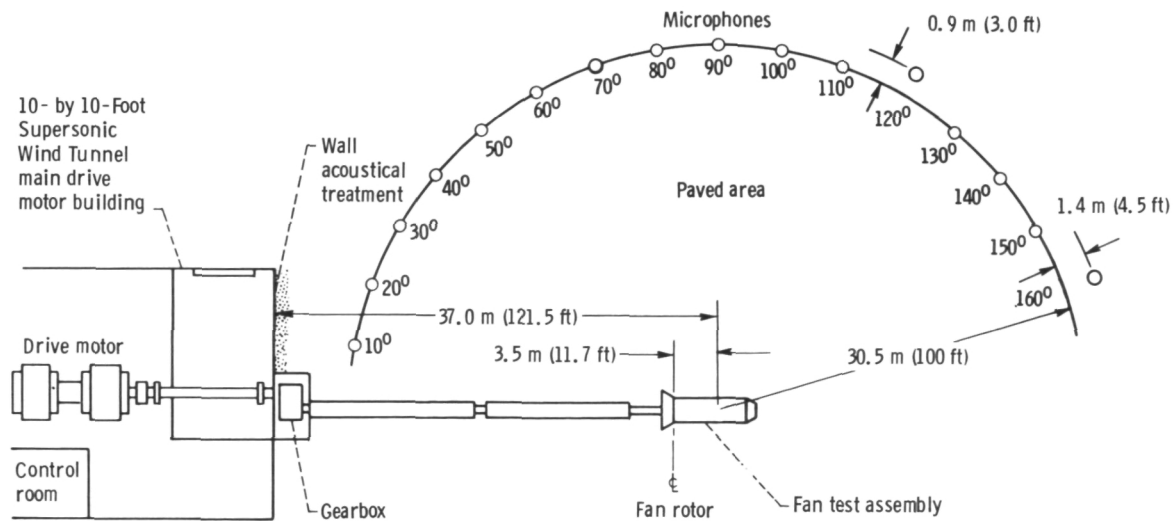


Figure 5. - Plan view of full-scale fan noise test facility.

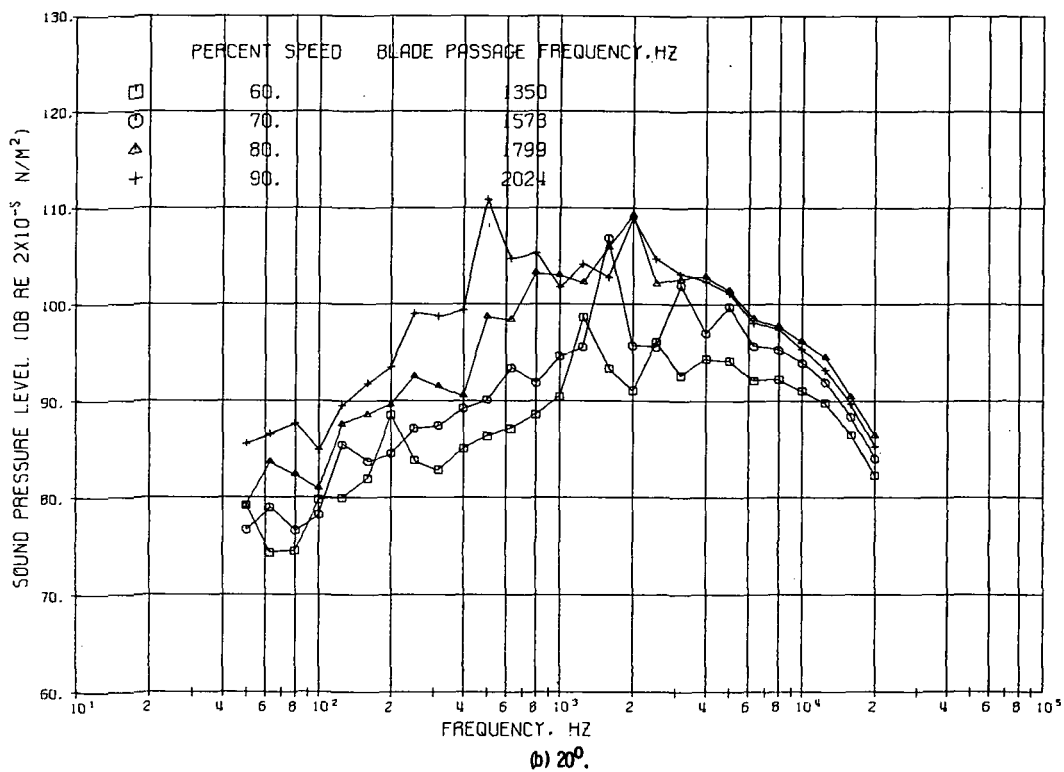
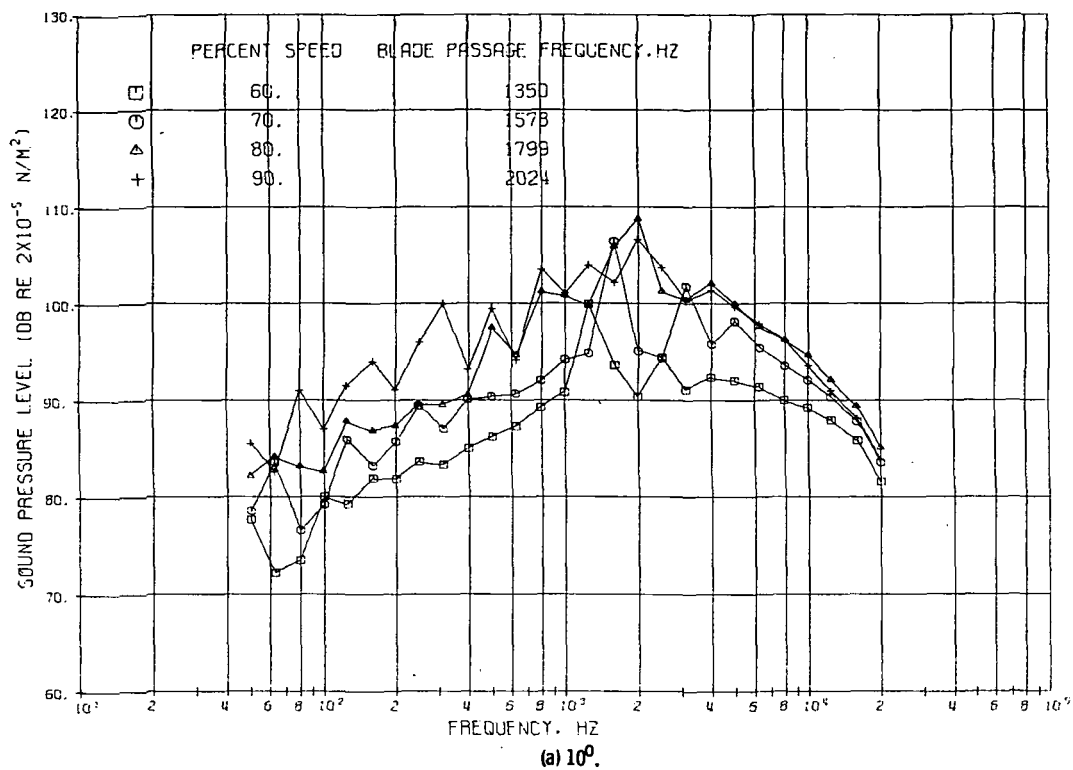


Figure 6. - Standard-day 1/3-octave band spectra on a 30.5-meter (100-ft) radius at each angle. Configuration 305: hard inlet, fully treated fan frame, hard exhaust, and nominal nozzle.

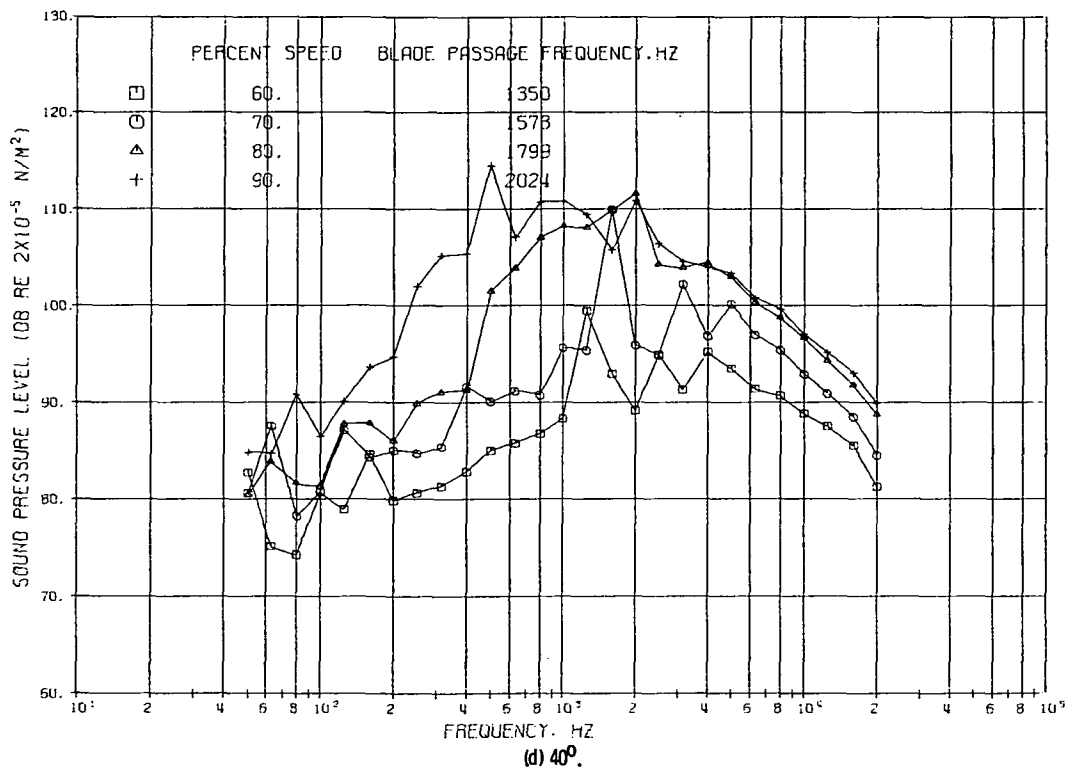
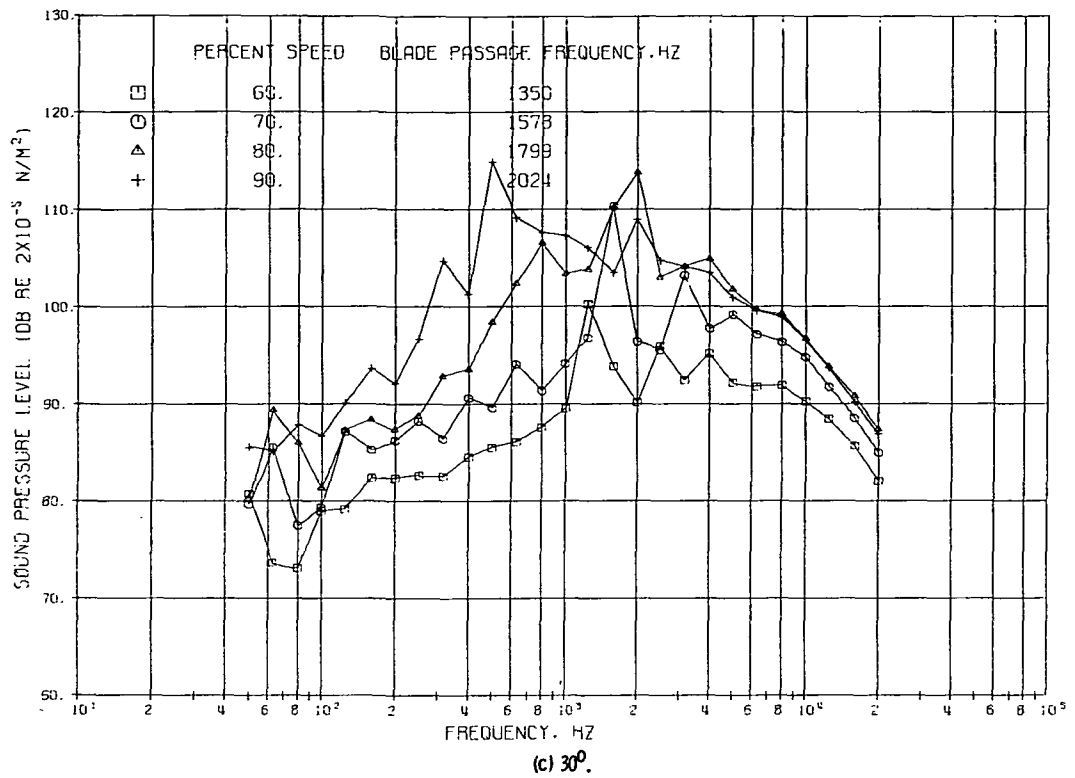


Figure 6. - Continued.

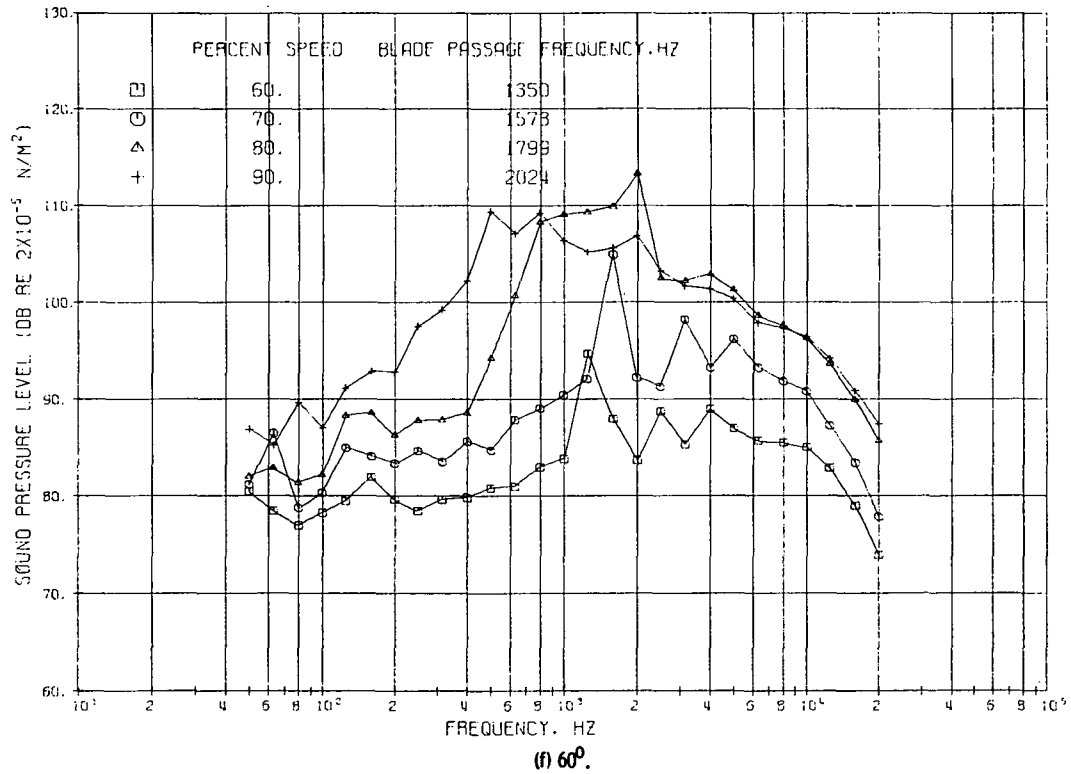
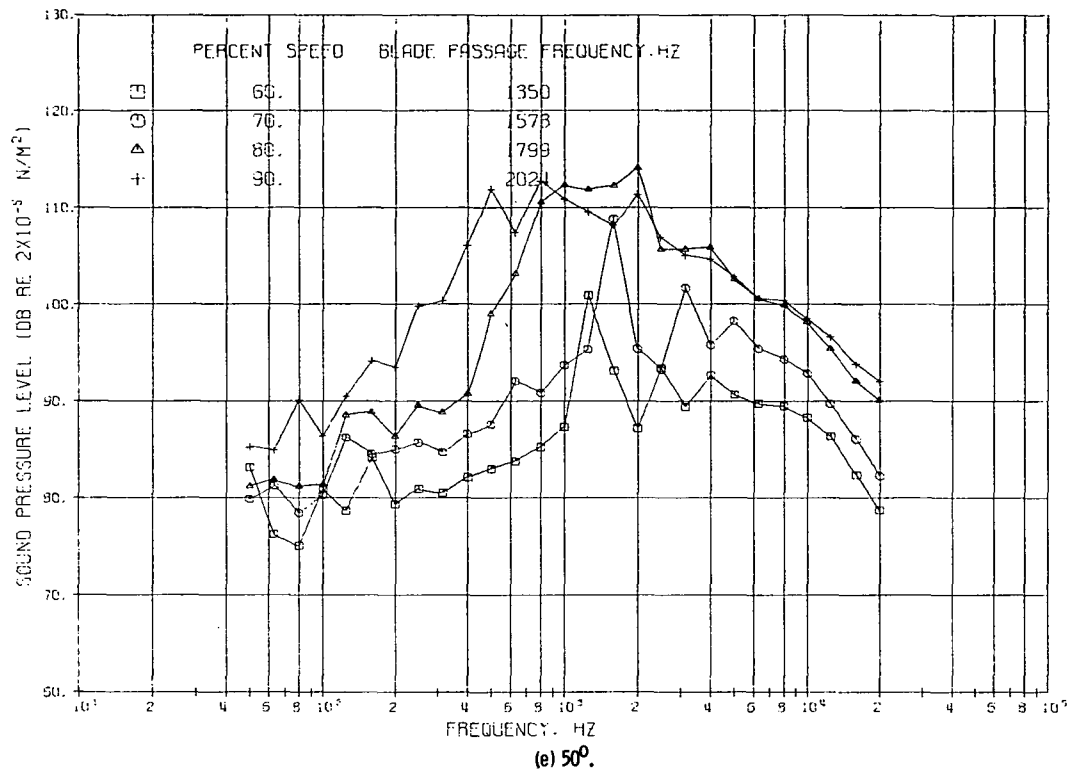
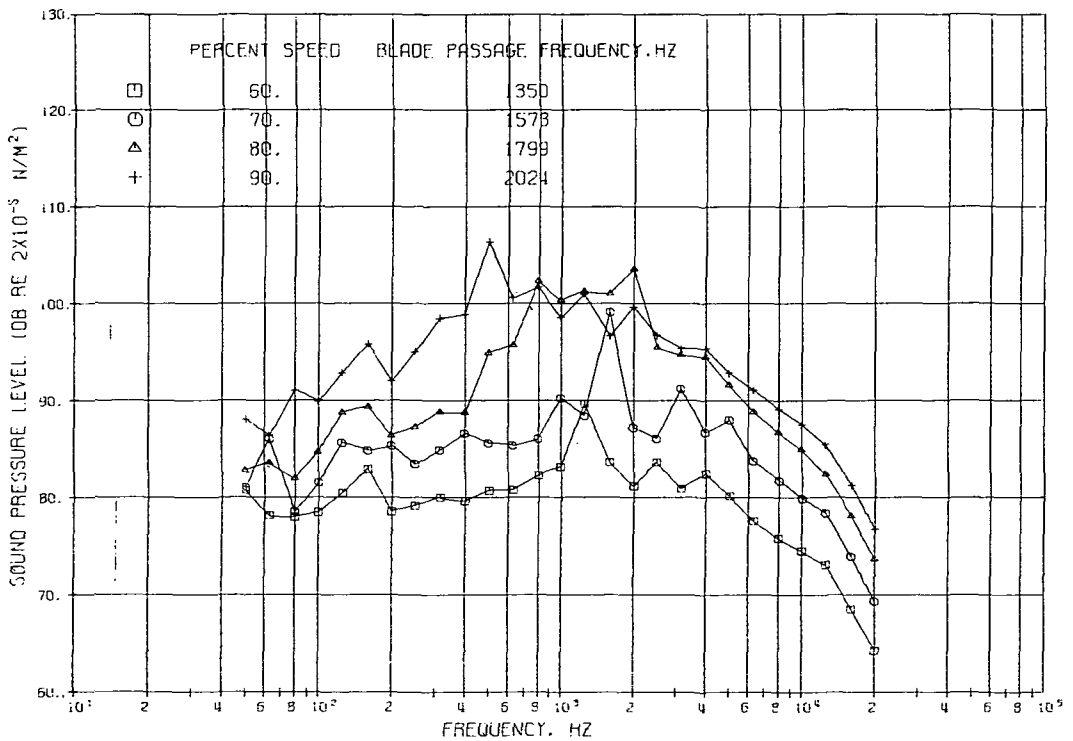
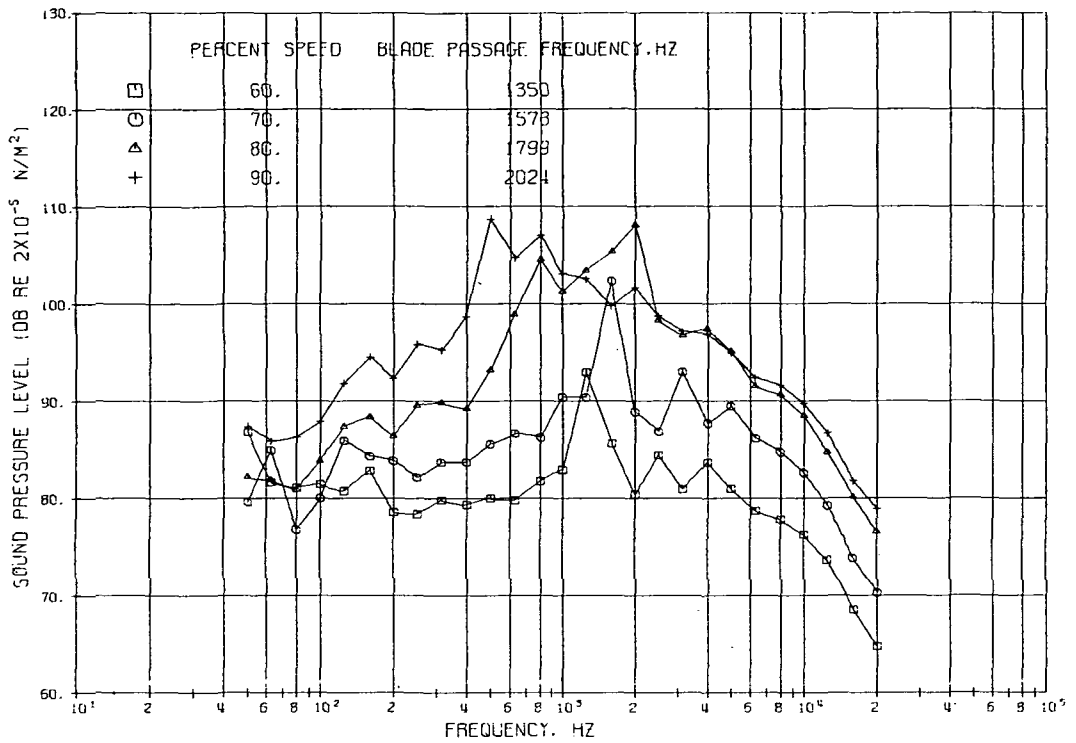


Figure 6. - Continued.



(h) 80°.

Figure 6. - Continued.

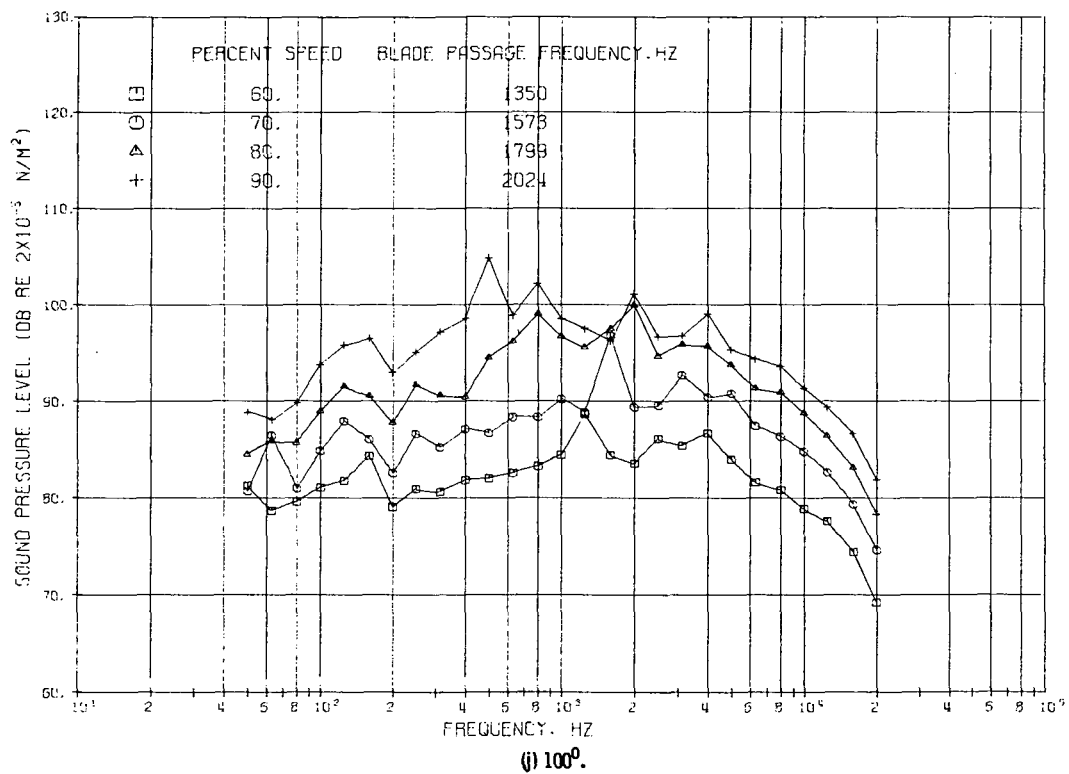
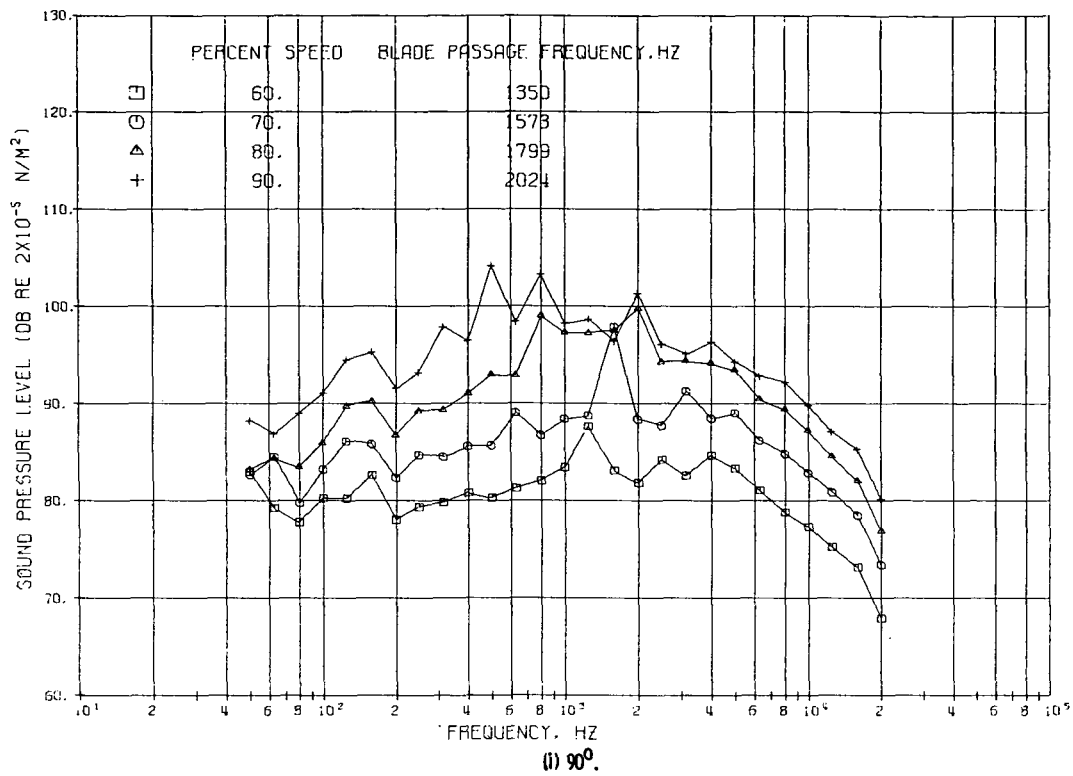


Figure 6. - Continued.

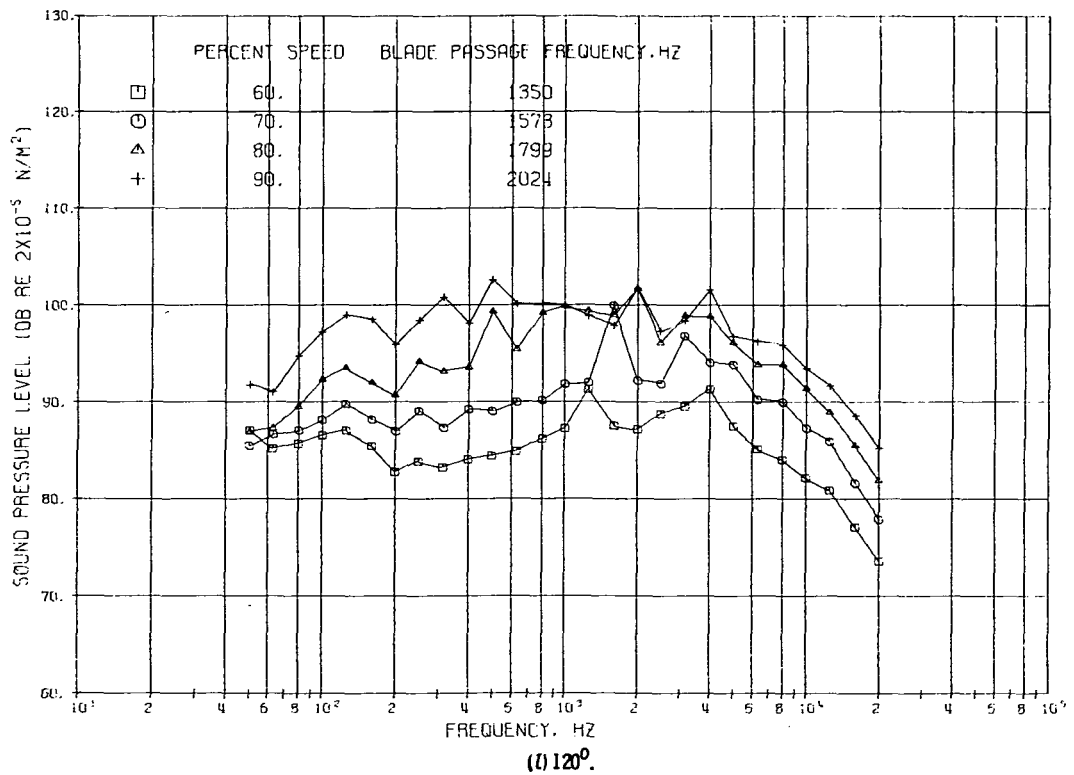
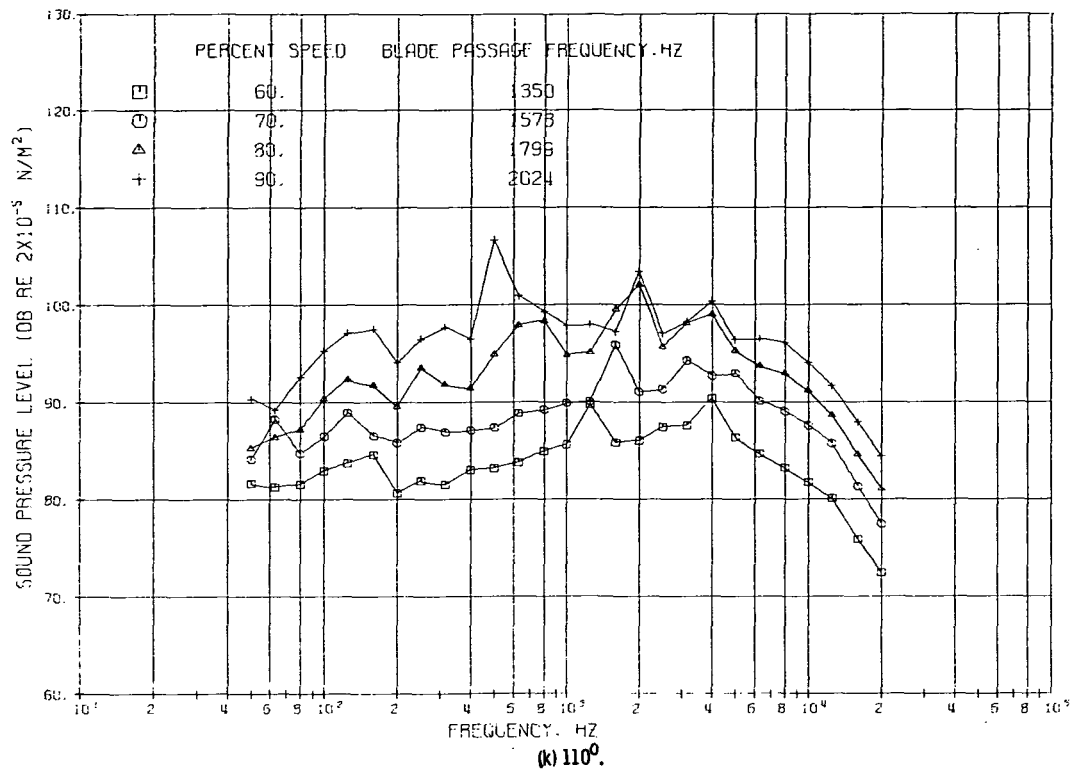


Figure 6. - Continued.

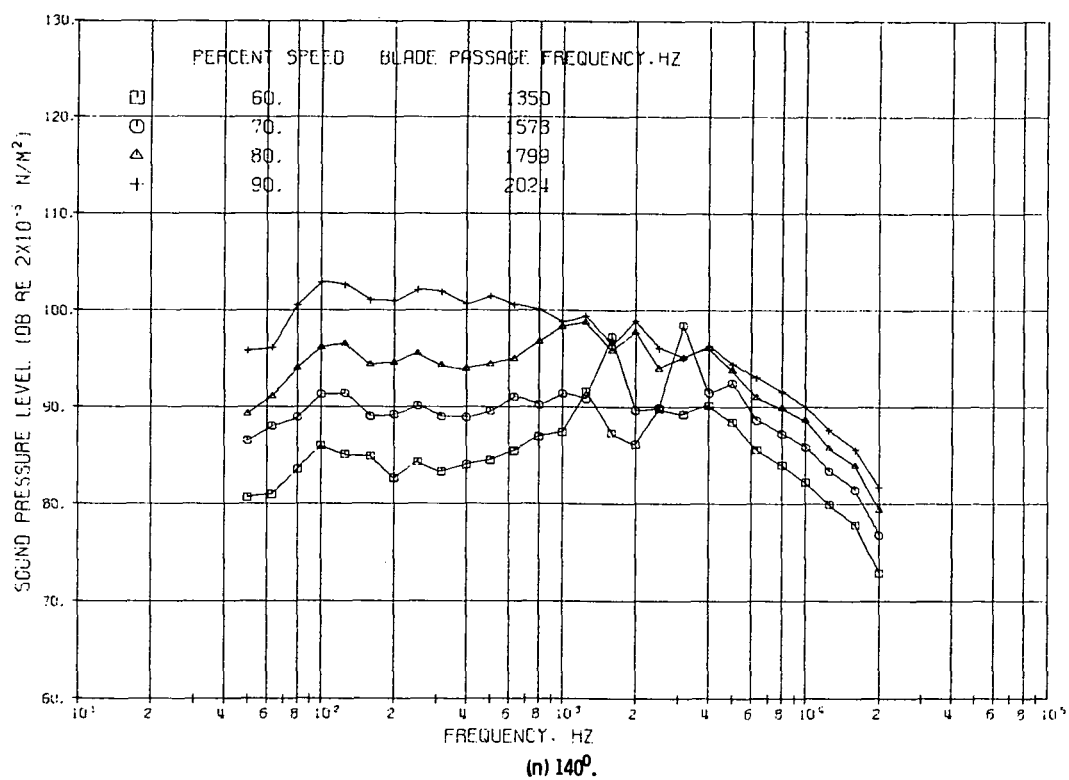
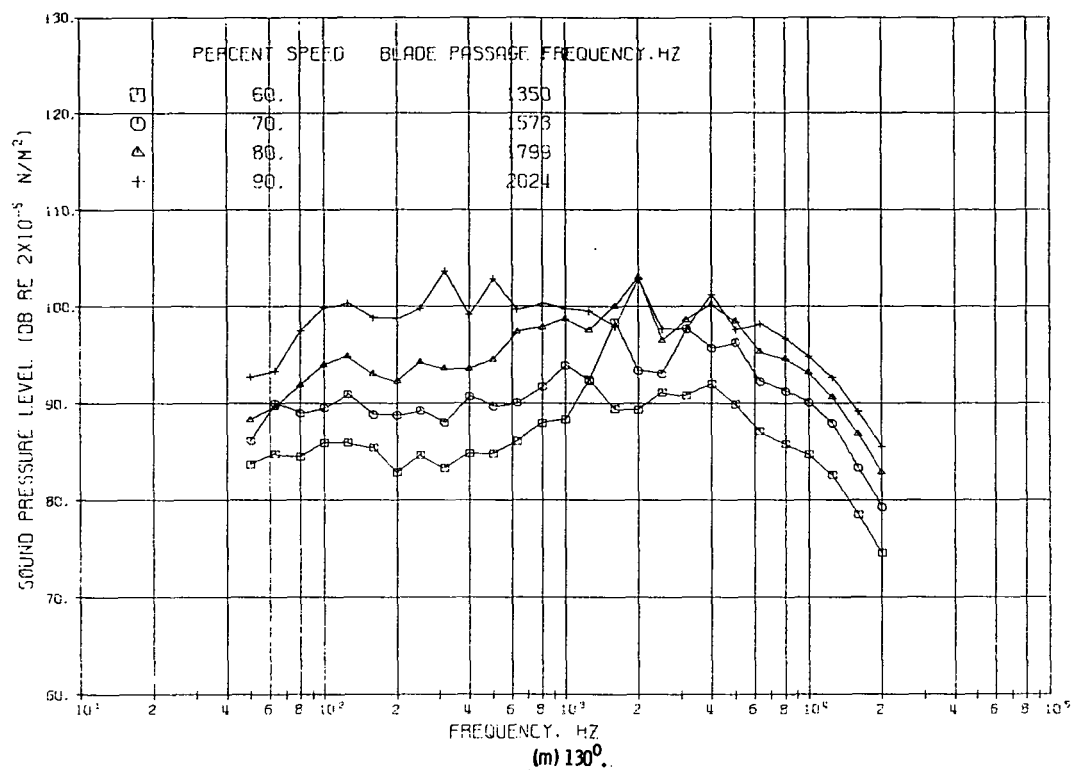


Figure 6. - Continued

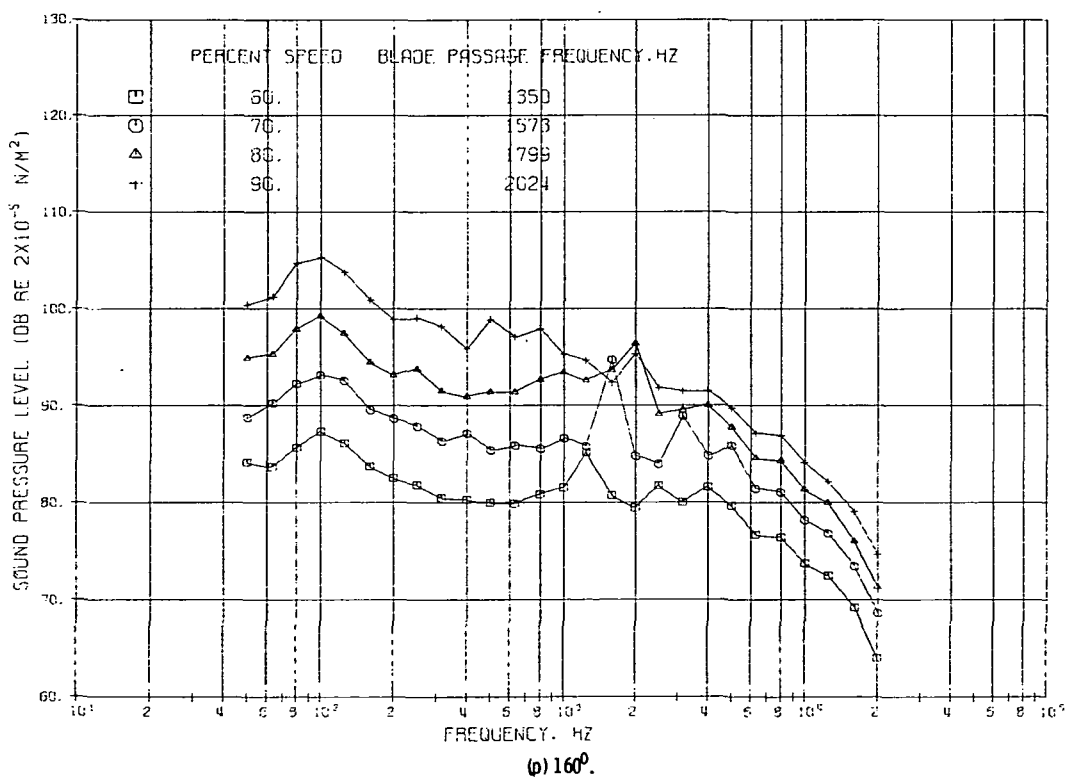
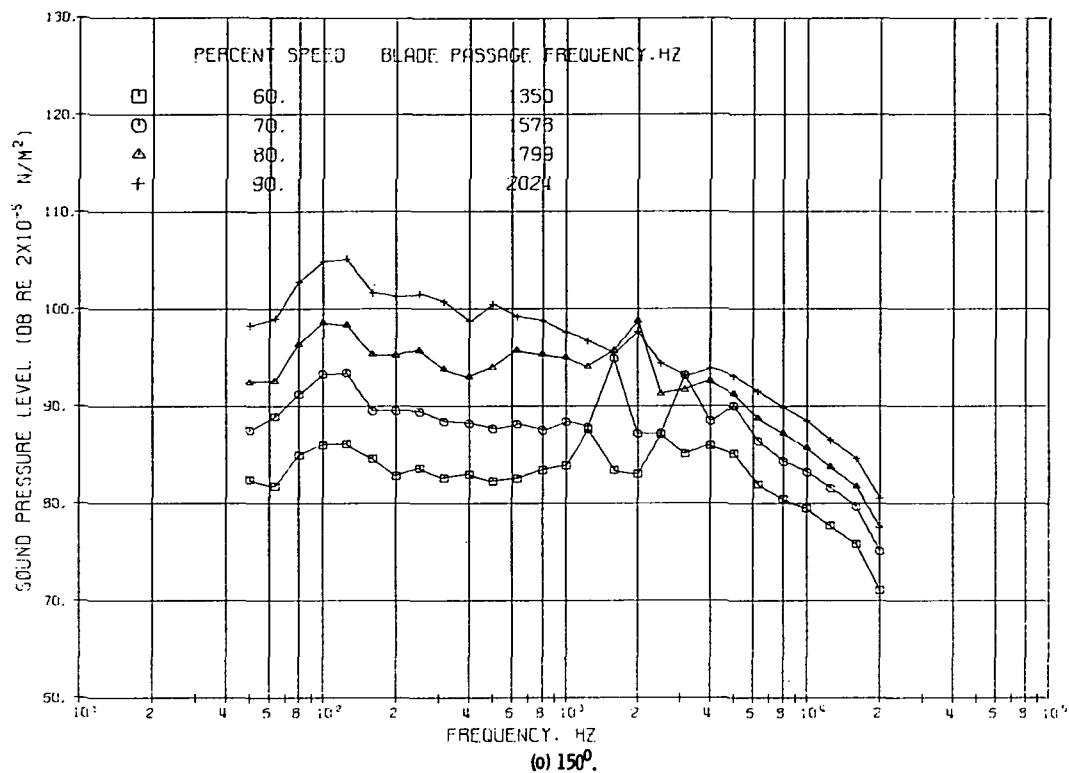


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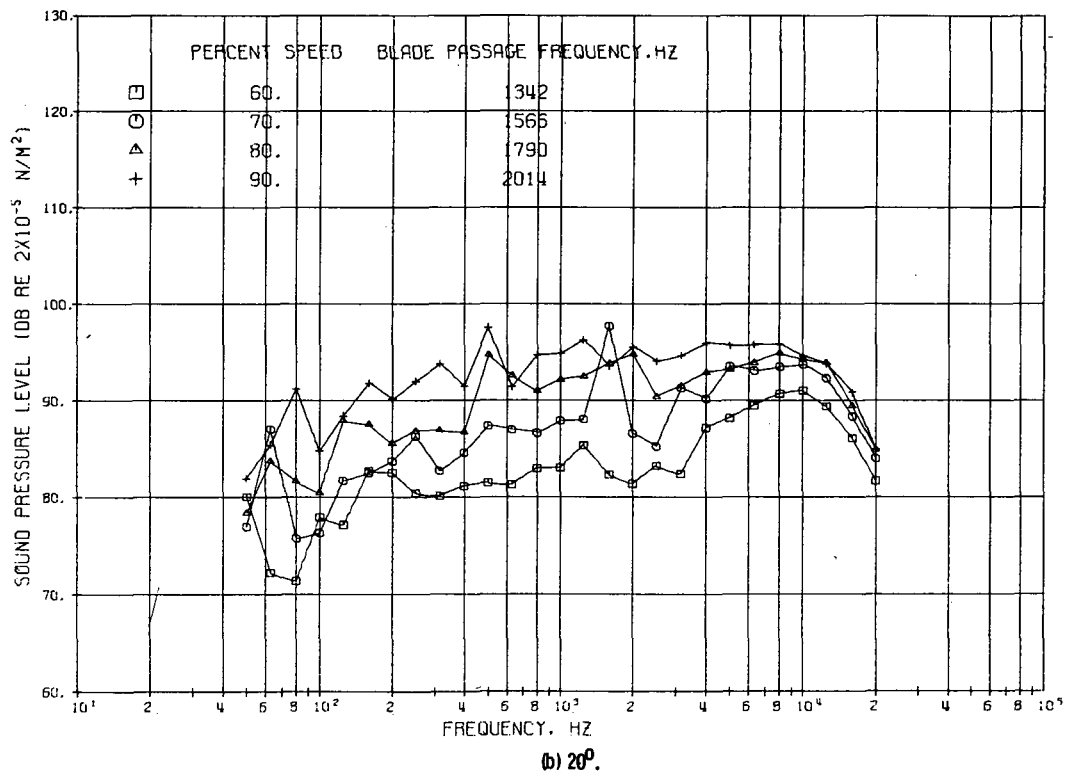
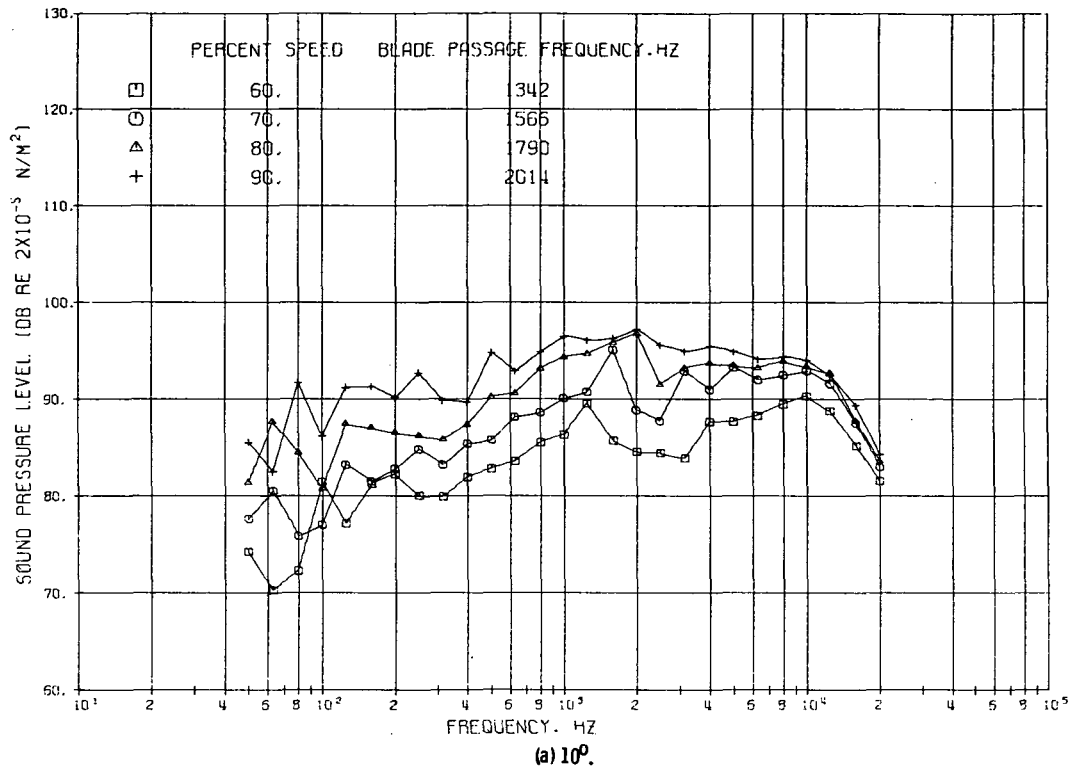


Figure 7. - Standard-day 1/3-octave band spectra on a 30.5-meter (100-ft) radius at each angle. Configuration 309: suppressed inlet, fully treated fan frame, suppressed exhaust, and nominal nozzle.

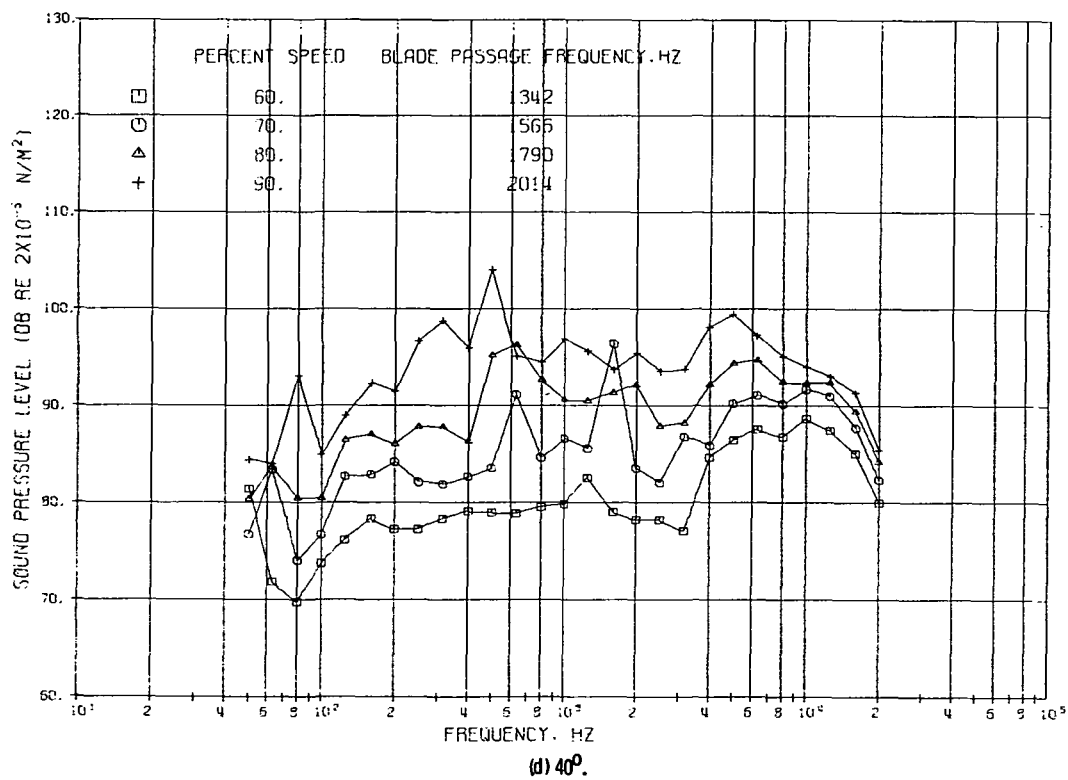
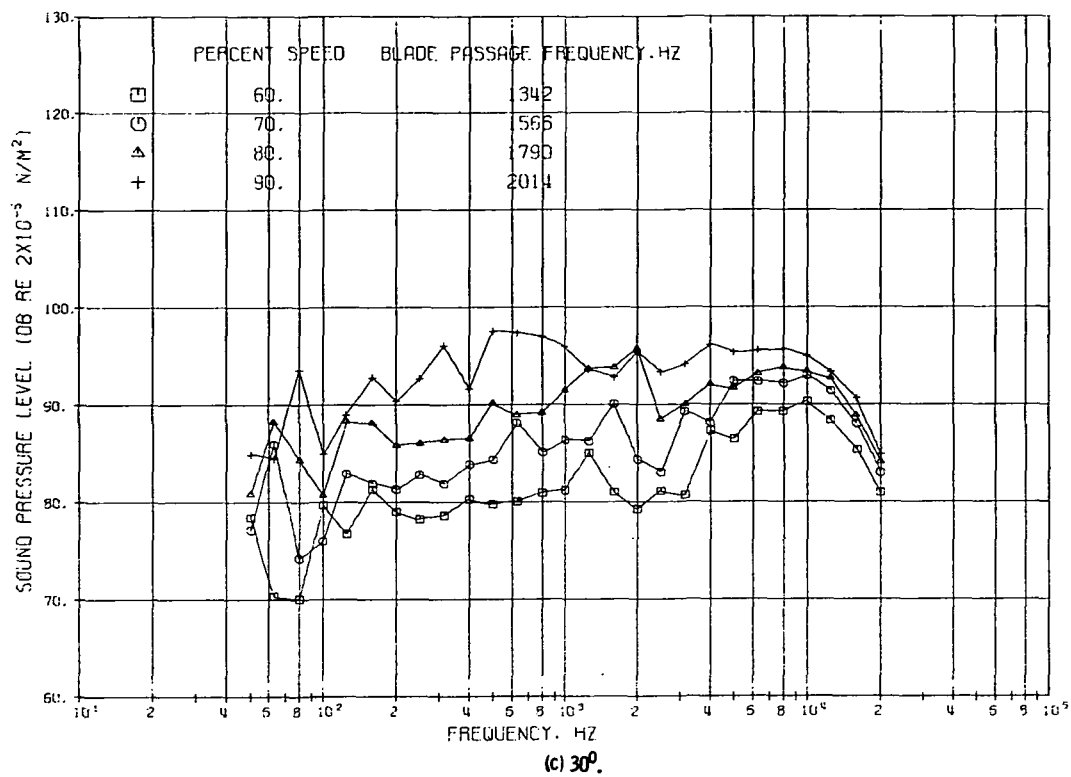


Figure 7. - Continued.

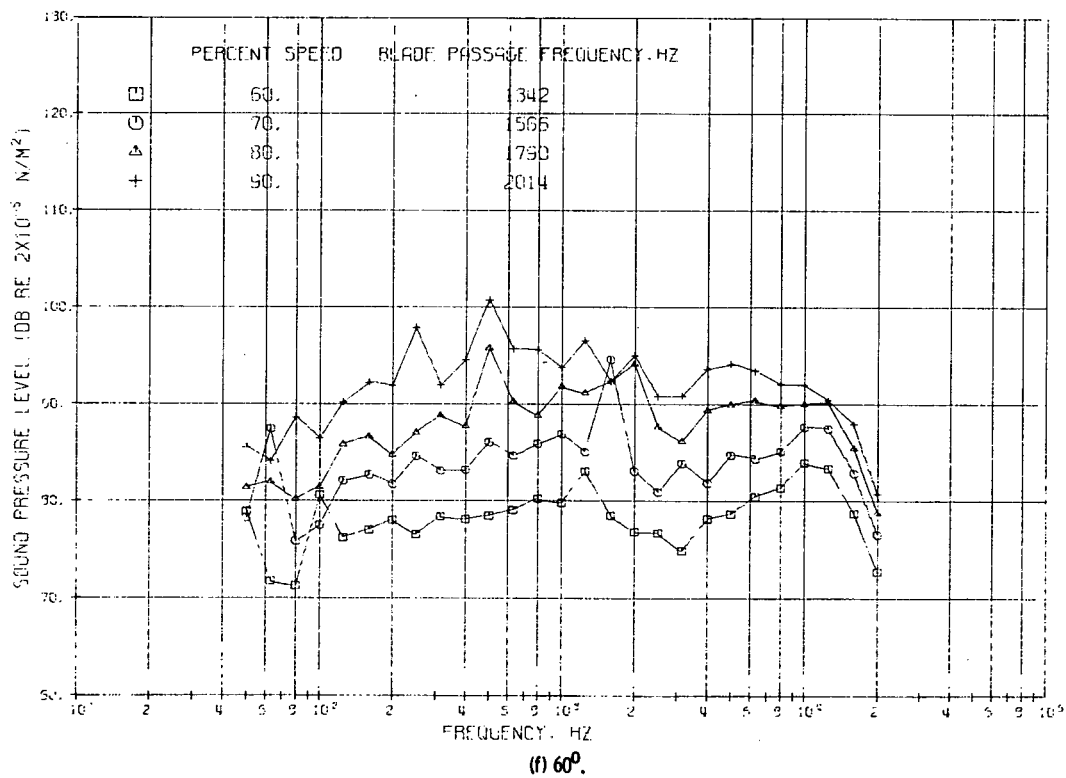
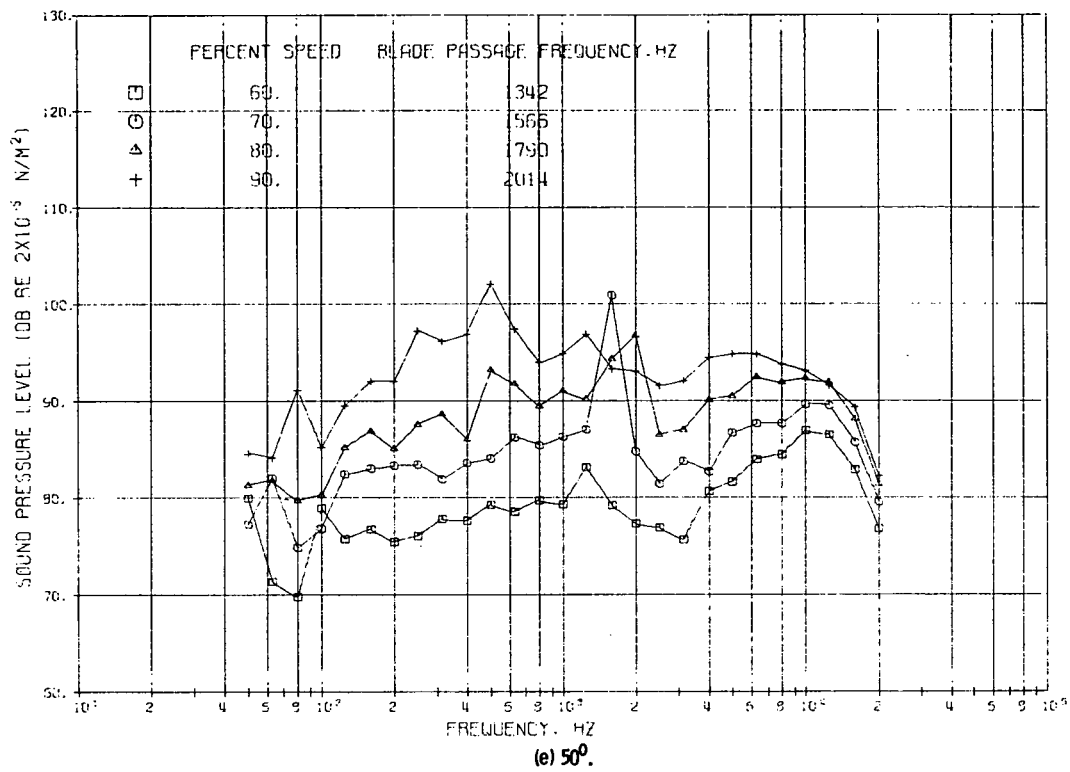


Figure 7. - Continued.

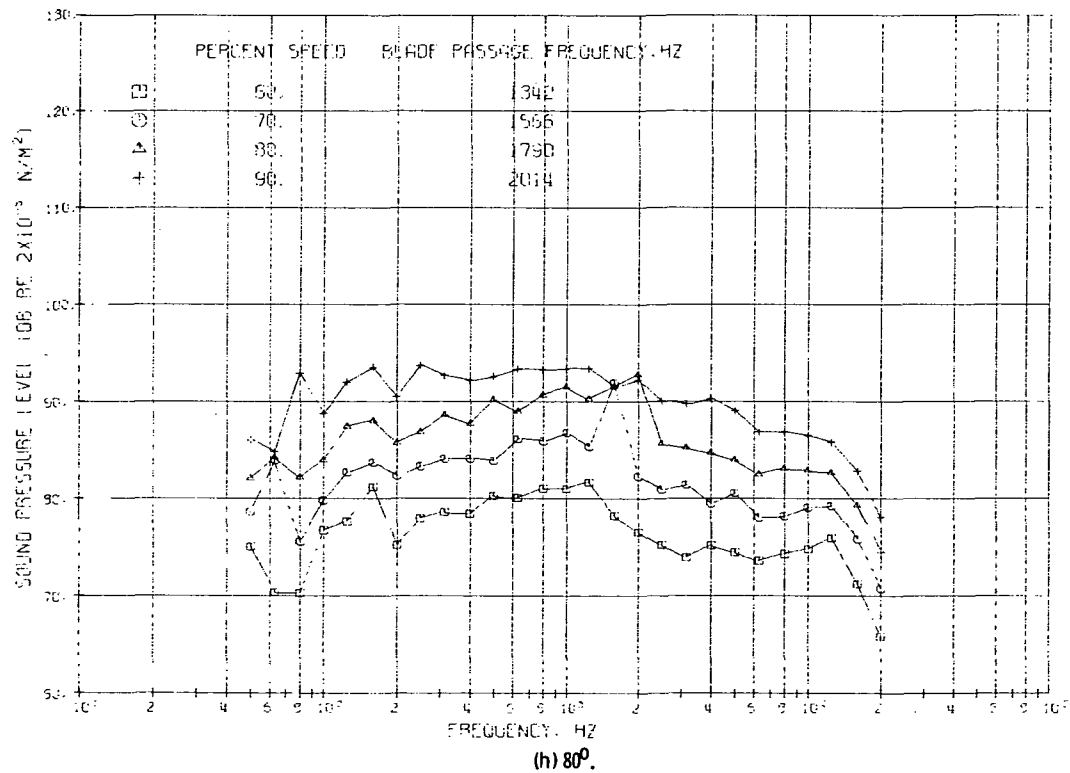
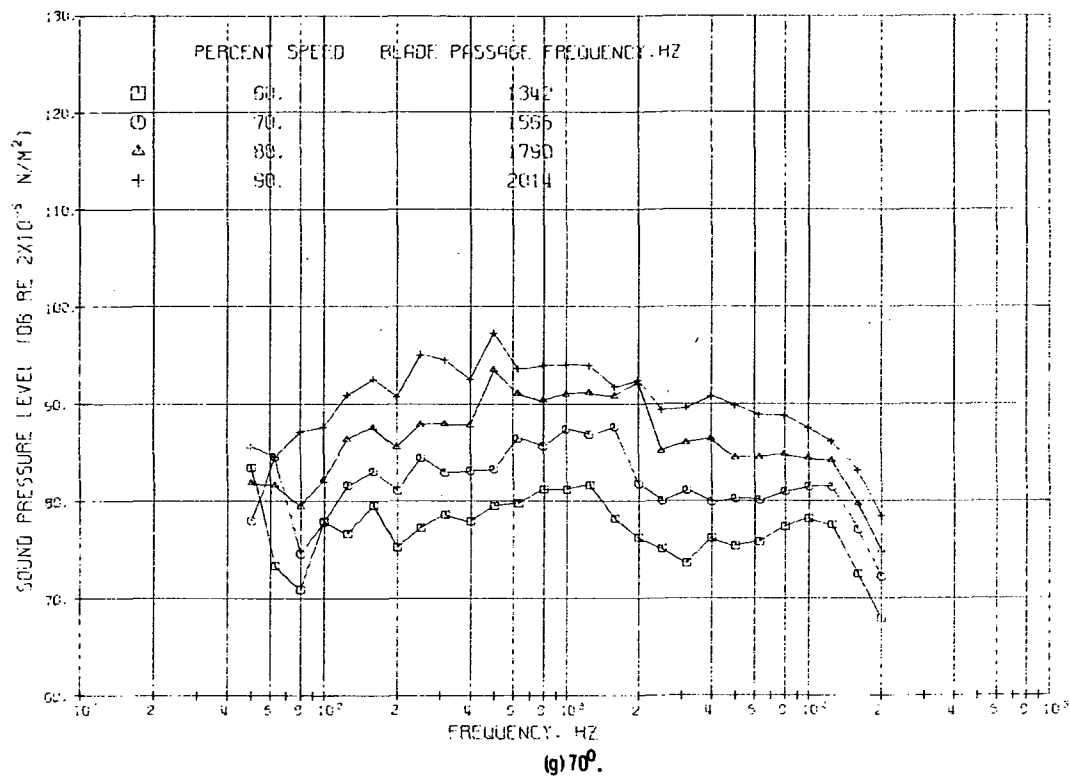


Figure 7. - Continued.

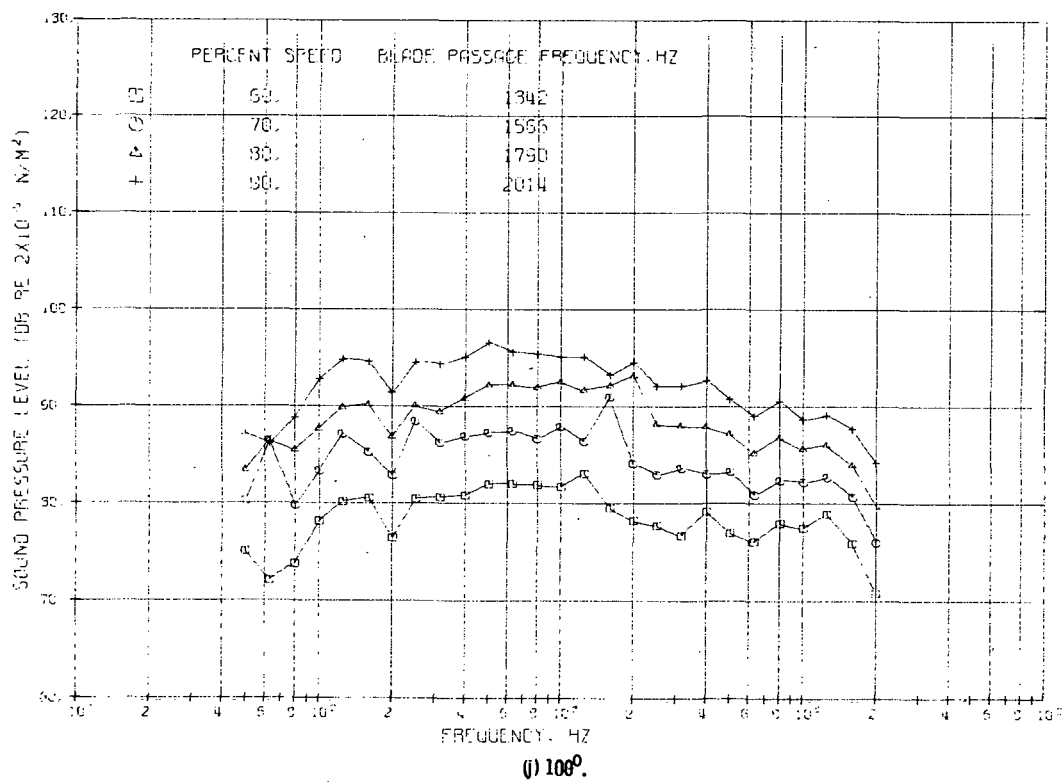
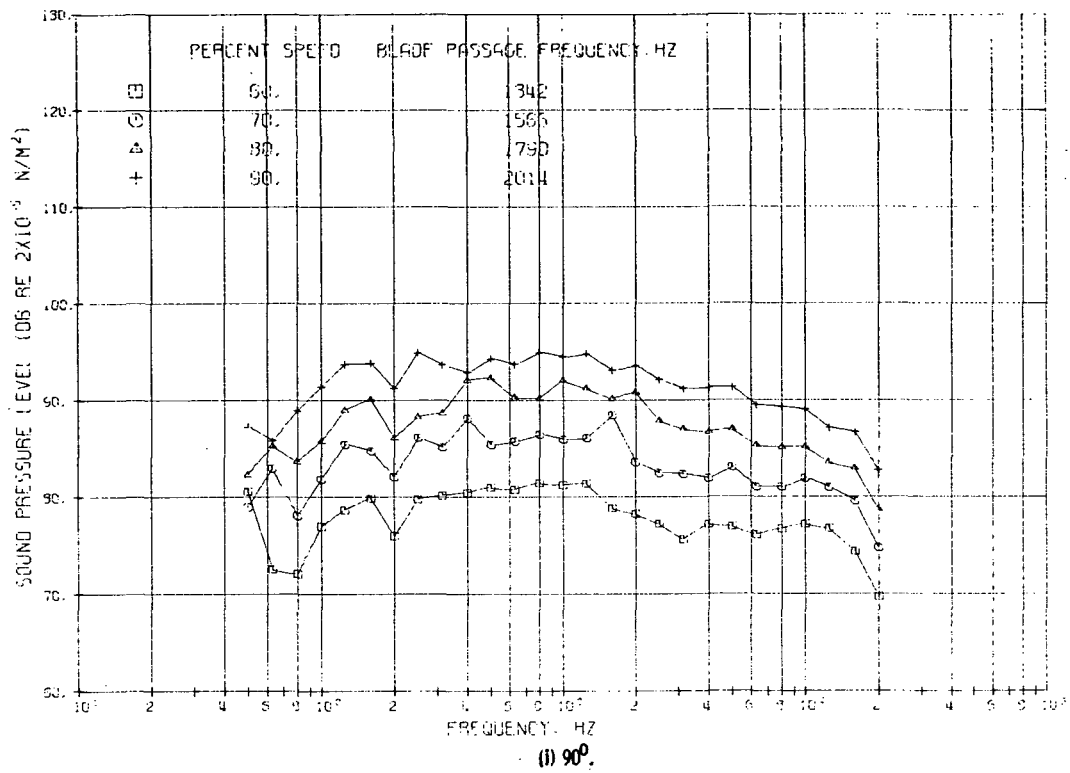


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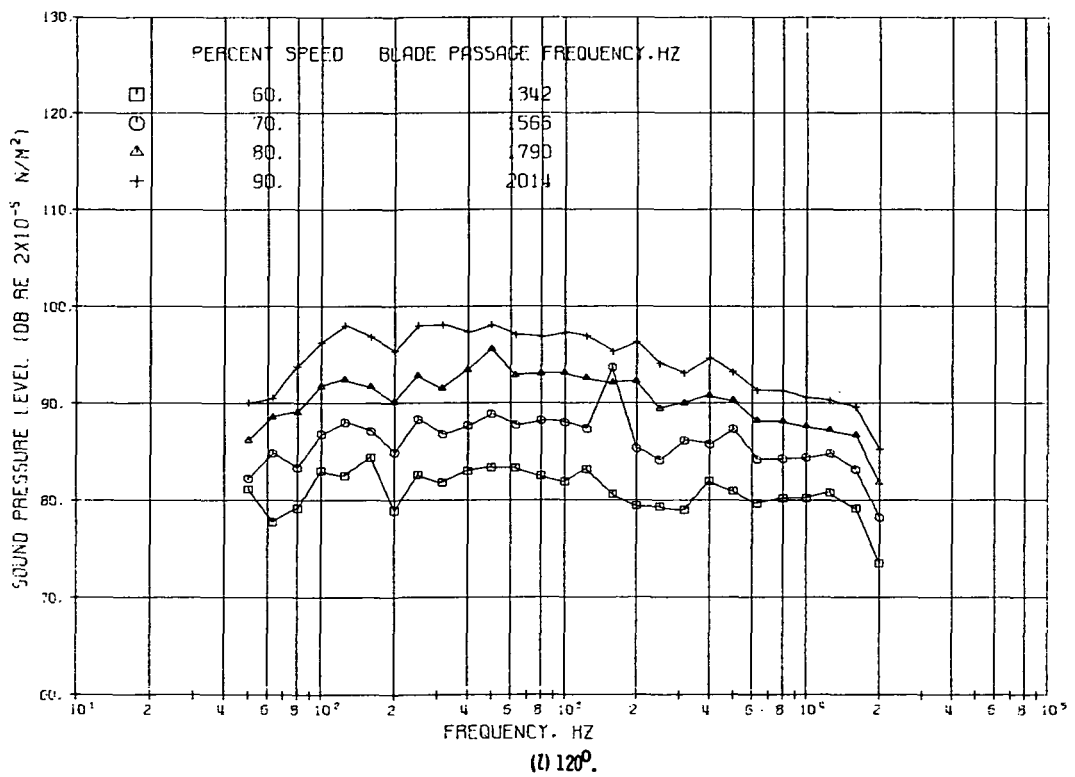
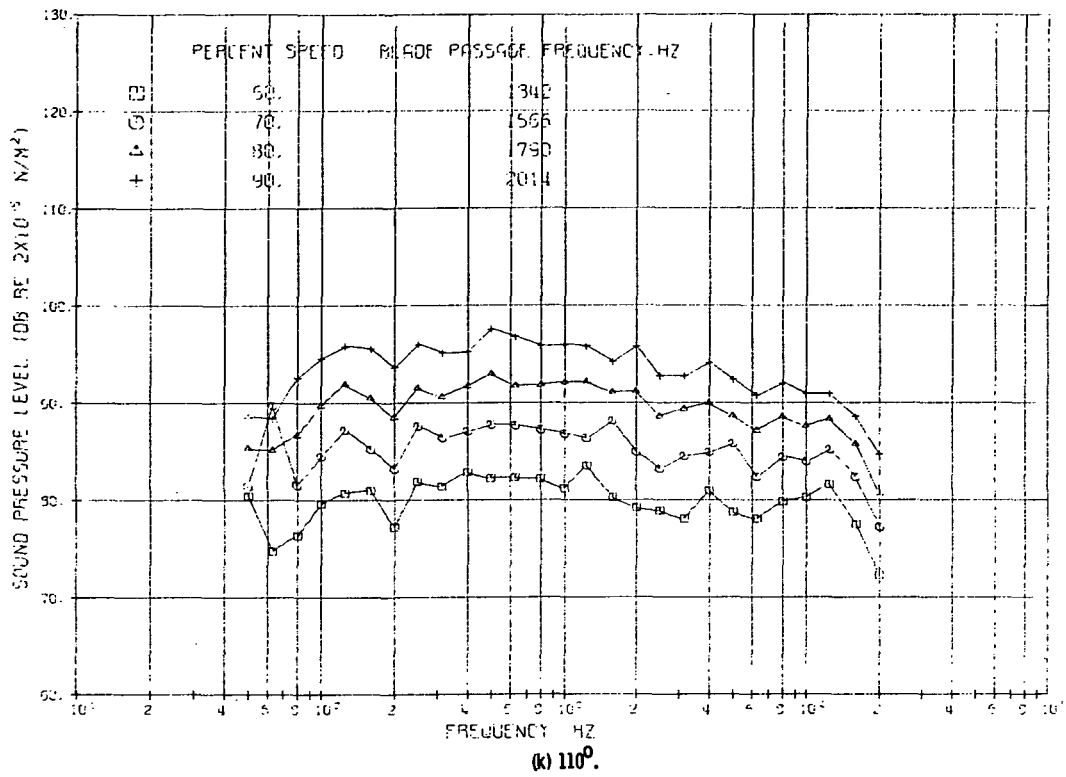


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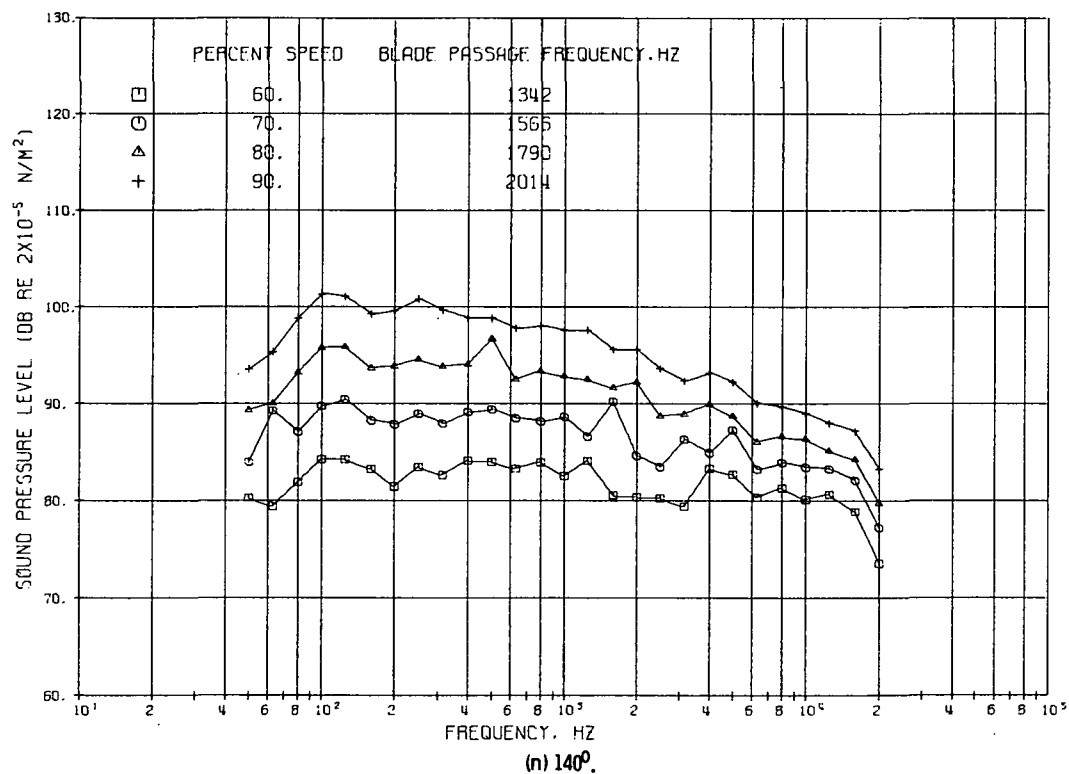
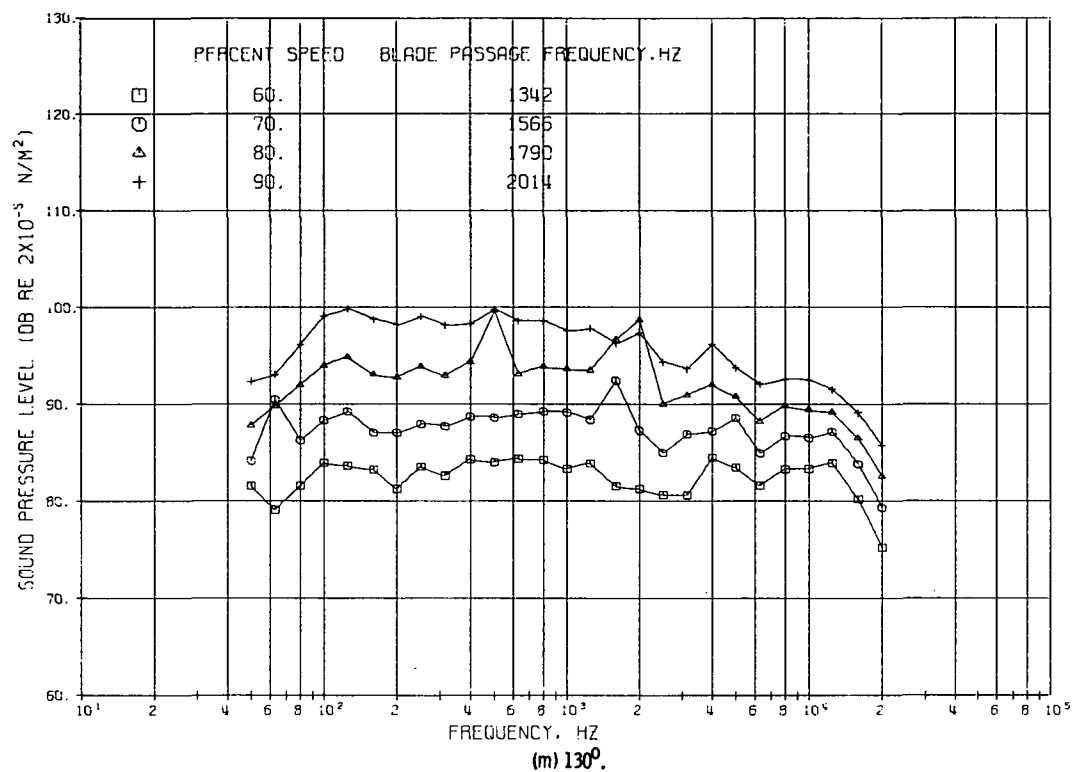


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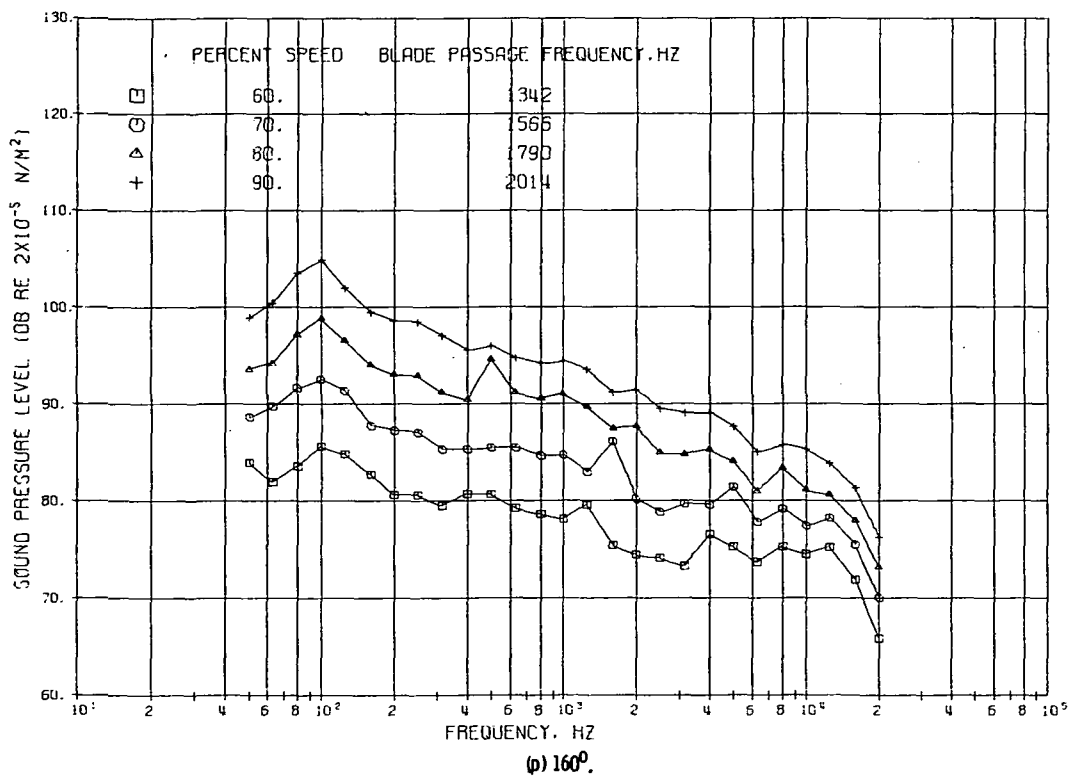
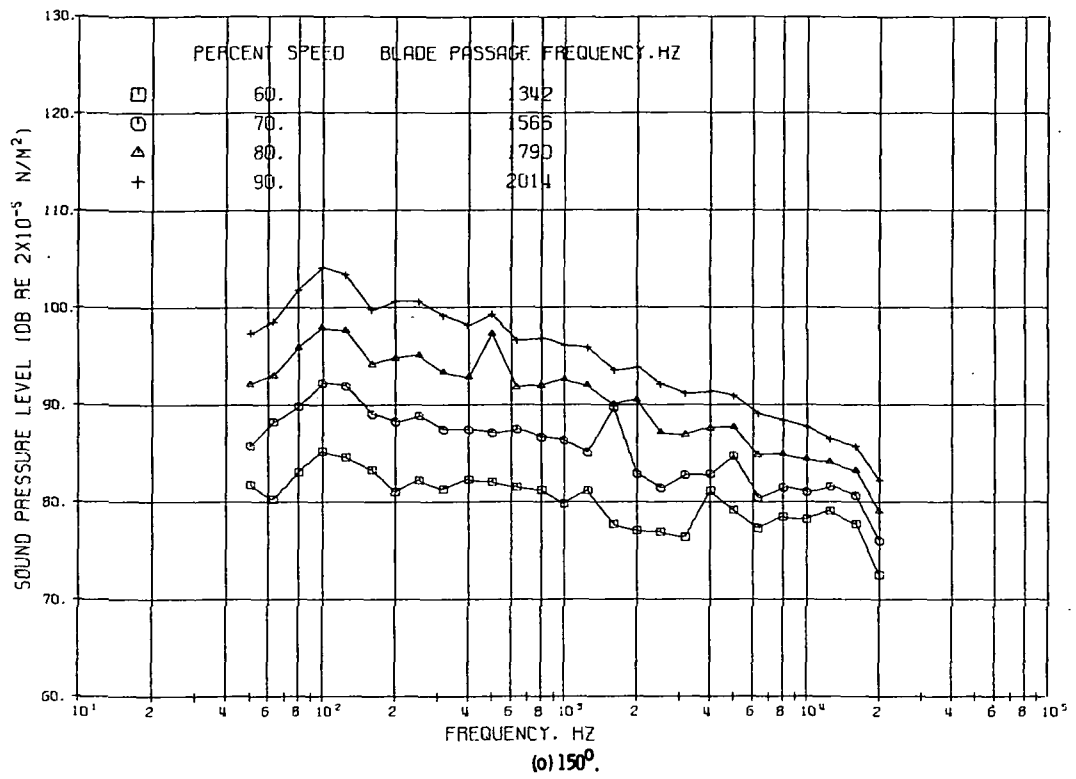


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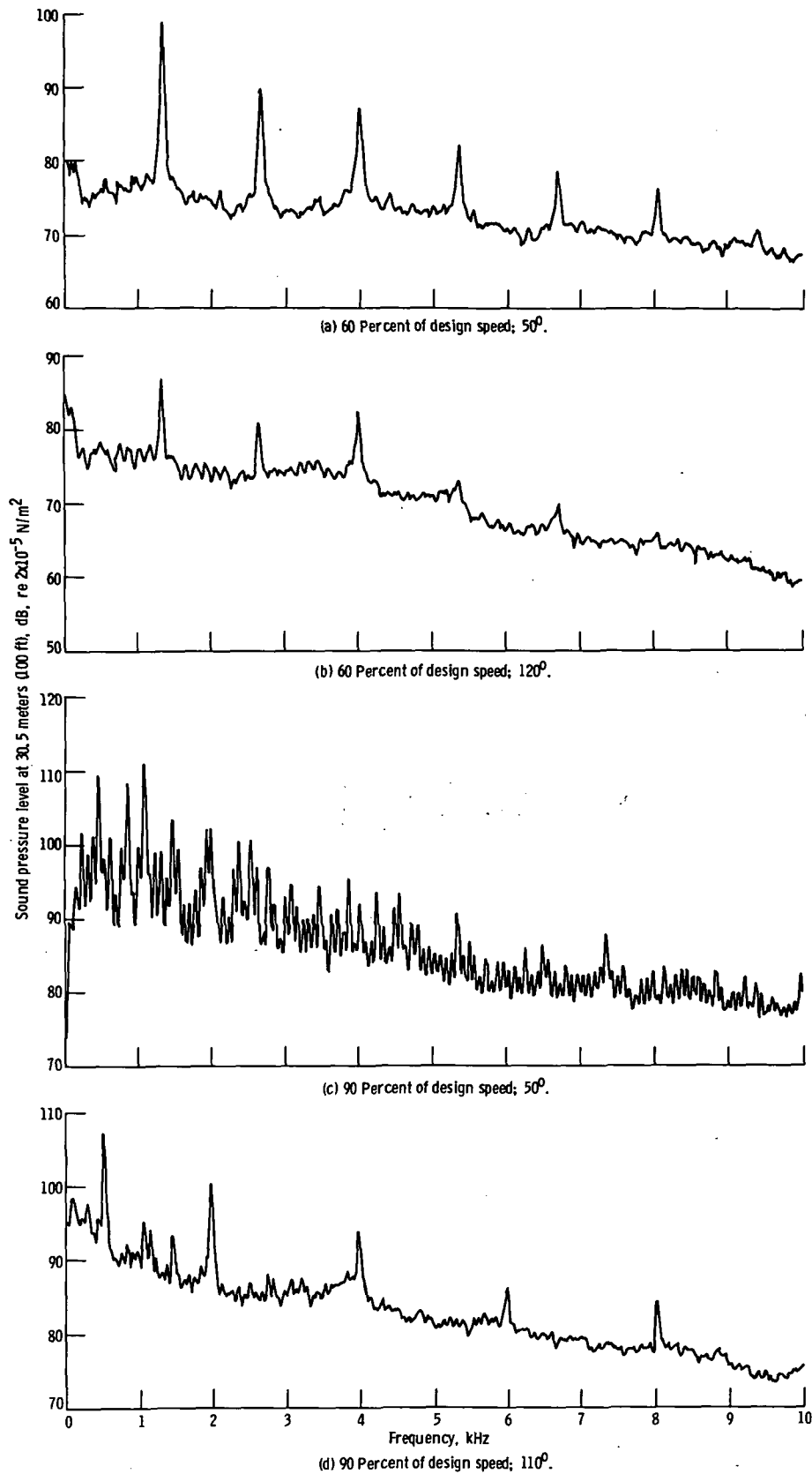


Figure 8. - Continuous 20-hertz constant bandwidth spectra at peak noise angles at 30.5-meter (100-ft) radius for configuration 305 (hard inlet, fully treated fan frame, hard exhaust, and nominal nozzle).

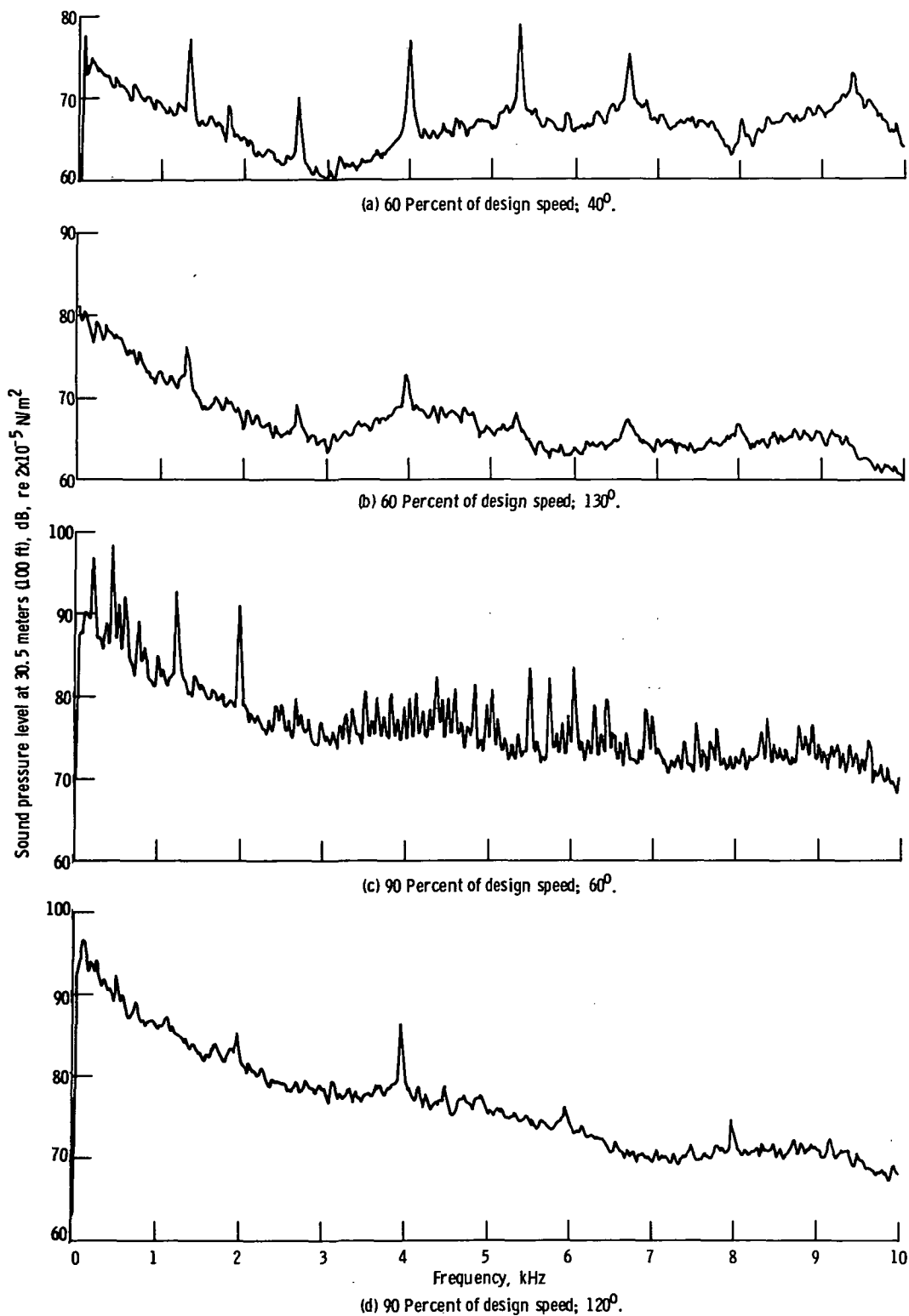


Figure 9. - Continuous 20-hertz constant bandwidth spectra at peak noise angles at 30.5-meter (100-ft) radius for configuration 309 (suppressed inlet, fully treated fan frame, suppressed exhaust, and nominal nozzle).



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